

THE FIG WASP FAUNA OF THE RECEPTACLES OF *FICUS THONNINGII* (HYMENOPTERA, CHALCIDOIDEA)

by

Z. BOUČEK¹), A. WATSHAM²) and J. T. WIEBES³)

With 158 text-figures and four colour-plates

ABSTRACT

Records and descriptions of the chalcids reared from the receptacles of *Ficus thonningii* Bl. (*burkei* (Miq.) Miq., *petersii* Warb.) mainly in Zimbabwe-Rhodesia, among which the following new species: *Camarothorax brevimucro* Bouček, spec. nov.; *equicollis* Bouček, spec. nov.; *longimucro* Bouček, spec. nov. — *Crossogaster odorans* Wiebes, spec. nov. — *Eurytoma ficusgallae* Bouček, spec. nov. — *Ficomila* Bouček, gen. nov., type-species *Ficomila curtivena* Bouček, spec. nov.; *gambiensis* (Risbec) Bouček, comb. nov. from *Decatoma*. — *Oritesella tsamvi* Wiebes, spec. nov. — *Ormyrus flavipes* Bouček, spec. nov.; *subconicus* Bouček, spec. nov.; *watshami* Bouček, spec. nov. — *Philotrypesis parca* Wiebes, spec. nov. — *Syceurytoma* Bouček, gen. nov., type-species *Syceurytoma ficus* Bouček, spec. nov. — *Sycophila flaviclava* Bouček, spec. nov.; *kestraneura* (Masi) Bouček, comb. nov. from *Decatoma*; *modesta* Bouček, spec. nov.; *naso* Bouček, spec. nov.; *punctum* Bouček, spec. nov.; *sessilis* Bouček, spec. nov. — *Sycoryctes hirtus* Wiebes, spec. nov.; *remus* Wiebes, spec. nov. — *Sycoscapter cornutus* Wiebes, spec. nov. — *Sycotetra* Bouček, gen. nov., type-species *Sycotetra serricornis* Bouček, spec. nov. — *Watshamiella* Wiebes, gen. nov., type-species *Watshamiella alata* Wiebes, spec. nov. — The following known species are recorded from the receptacles of *Ficus thonningii*: *Alfonsiella brongersmai* Wiebes; *longiscapa* Joseph. — *Elisabethiella stuckenbergi* (Grandi). — *Phagoblastus barbarus* Grandi. — The following new species and combinations originate from other localities: *Camarothorax africanus* (Wiebes) Bouček, comb. nov. from *Sycobia* (ex *Ficus* cf. *eriobotryoides* K. & B., Sierra Leone); *imerinensis* (Risbec) Bouček, comb. nov. from *Callimomus* (Malagasy); *orientalis* (Wiebes) Bouček, comb. nov. from *Sycobia* (ex *Ficus reflexa* Thunb., Aldabra). — *Ormyrus chevalieri* (Risbec) Bouček, comb. nov. from *Monobaeus*; *decaryi* (Risbec) Bouček, comb. nov. from *Tribaeus*. — *Sycophila*, new combinations, all from *Decatoma*: *aethiopica* (Silvestri) Bouček; *cassinopsisi* (Risbec) Bouček; *nigrofasciata* (Risbec) Bouček; *ruandensis* (Risbec) Bouček; *rubra* (Risbec) Bouček; *xiphigaster* (Risbec) Bouček. — *Watshamiella infida* Wiebes, spec. nov. (ex *Ficus religiosa* L., Sri Lanka); *stilifera* (Wiebes) Wiebes, comb. nov. from *Sycoscapteridea* (ex *Ficus stupenda* Miq., North Borneo).

A key is given to the chalcids associated with the receptacles of *F. thonningii*, irrespectively whether coming from evidently galled ones or not. The species having a closer association with the fig, especially the pollinators, are also mentioned in the introductory description of the fig cycle and the chalcid wasp fauna of the best studied species of *Ficus* are reviewed.

¹) Commonwealth Institute of Entomology, c/o British Museum (Natural History), London, England.

²) St. Ignatius College, Salisbury, Zimbabwe-Rhodesia.

³) c/o Rijksmuseum van Natuurlijke Historie, Raamsteeg 2, Leiden, The Netherlands (requests for reprints to be sent to this address).

INTRODUCTION

For some years, one of us has been observing fig insects from what is called *Ficus burkei* on Chishawasha Mission, near Salisbury, Zimbabwe-Rhodesia. In the present paper, the general chapter on the fig cycle and the colour-plates are by his hand (A. W.). The insects collected were sent for identification to Europe, where they were divided into two lots, viz., the Agaonidae and the groups known as Sycoecini, Philotrypesini, Sycoryctini and Otitesellini (treated by J. T. W.), and the Epichrysomallinae, Eurytomidae and Ormyridae (treated by Z. B.). In a short chapter on the classification of chalcidoid fig wasps, some alterations are suggested as to their placement in one of the families Torymidae and Pteromalidae (Z. B.).

Some additional material was collected by Dr. M. G. Bingham (Lusaka) in Zambia, or taken from the BMNH collection. Also some colleagues from South Africa, viz., Dr. C. Eardley (Pretoria), Dr. S. Naser (Stellenbosch) and Dr. M. L. Penrith (Windhoek) kindly sent fig material when requested. In several instances, our treatment led to a revision of the genus or group concerned, and typical material of extralimital species or forms from other host *Ficus*, were requested on loan. Thanks are due to the curators of the following collections, for complying with our requests (the abbreviations of the institutes are those used throughout the text): British Museum (Natural History), London (BMNH); Cornell University, Entomology Department, Ithaca, N.Y.; Laboratorio di Entomologia, Bologna (LEB); Muséum National d'Histoire Naturelle, Paris (MNHN); Rijksmuseum van Natuurlijke Historie, Leiden (RMNH).

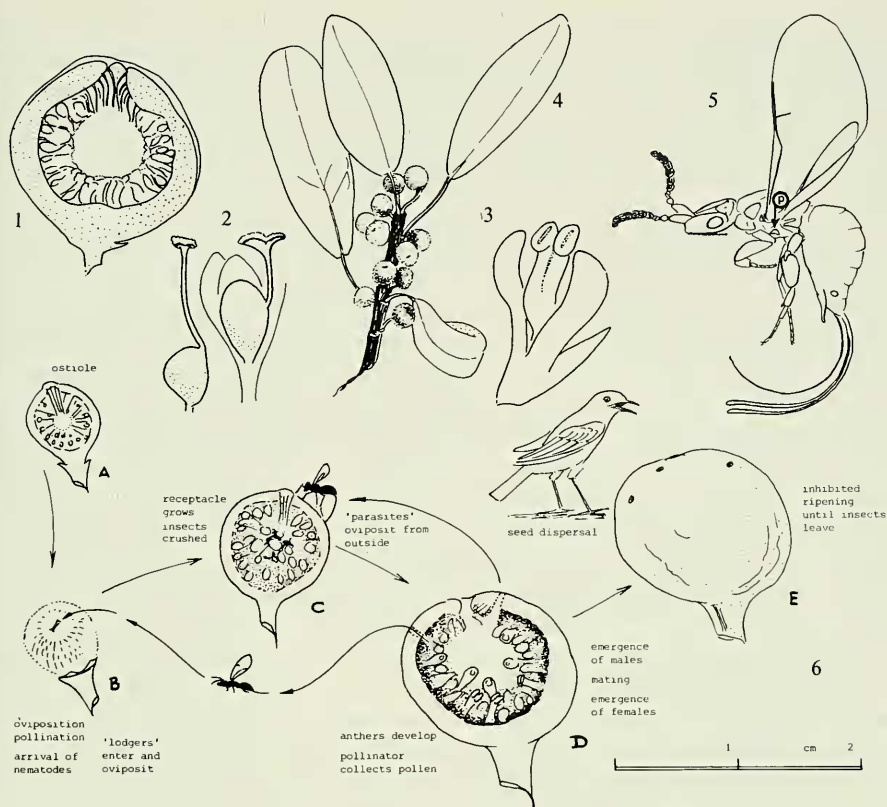
Acknowledgements are also due to Dr. C. C. Berg (University of Utrecht, The Netherlands), for botanical help and reading portions of the manuscript. Dr. R. B. Drummond of the Salisbury Herbarium arranged for the preserving of the *Ficus*-specimen and was helpful with botanical advice.

Publication of the four colour-plates was made possible by a grant from the Uytenboogaart-Eliassen Stichting at Amsterdam.

THE FIG CYCLE

Ficus thonningii Blume is an extremely variable species in which can be included *Ficus burkei* (Miquel) Miquel and *F. petersii* Warburg, hitherto separated on minor differences in leaves and figs. Although their conspecificity is recognized, the names *F. burkei* and *petersii* are still used here, as samples have been sent under those names. In *Ficus thonningii* s.l. the trees are up to 15 m high. The leaves are obovate to elliptic or even lanceolate, glabrous or beneath pubescent, the apex is short-acuminate to obtuse, the base acute to rounded. The figs are borne in the leaf axils or just below the leaves, they are sessile or pedunculate, sparsely puberulous to densely pubescent. Material of *Ficus thonningii* is often confused with *Ficus natalensis* Hochstetter and *F. craterostoma* Milne-Edwards & Burdet. The latter two species are sometimes treated as distinct, by others considered as inseparable (e.g., Palmer, 1977: 85, 89).

When sectioned a fig can be seen to have a space in the centre, surrounded by



Figs. 1—6. *Ficus thonningii* Bl. and *Elisabethiella stuckenbergi* (Grandi). 1, section through a young fig (in the receptive stage B); 2, female florets, with styles of different lengths; 3, male floret (ripe in stage D); 4, general appearance of a twig with leaves and figs; 5, female fig wasp, showing pollen pockets (p); 6, the fig cycle, running from a young receptacle A, over B (in which the pollinators and the lodgers enter), C (in which most parasites oviposit) and D (from which the wasps of the new generation emerge), to the ripe fig E, the fruits of which are dispersed, a.o. by birds. (Scale to figs and insects of fig. 6).

florets, the outer layer being an enlarged receptacle (fig. 1). Bracts form an ostiole by which insects may enter; entrance is limited to those insects that are adapted to crawling through narrow places. Such adaptations of the female of *Elisabethiella stuckenbergi* (fig. 5) are seen in the legs, the wings and the head and antennae. The legs, hind and front, are powerfully developed, whereas the middle pair are not. The tibiae are short and strong, with numerous spines. The head has a sunken central membraneous region, which allows it to be deformed when entering, and protects part of the antennae. The mandibular appendage may assist her in forcing her way in. The trailing segments of the antennal club and funicle break off and the wings detach when she enters the fig.

At the early stage (B, fig. 6) it is comparatively easy for the female to crawl in through the ostiole. Inside there is a space for her, surrounded by an even layer of

stigmas (synstigma, Galil & Eisikowitch, 1968: 261¹). In the section of the fig it can be seen that the styles are of different lengths (fig. 2). The insect has a short ovipositor, which limits her ability to lay eggs in the florets with the shorter styles: in these the new generation of wasps will develop. The florets with the longer styles are more likely to become seeds. The receptacle is monoecious, the male florets are scattered amongst the female and there are relatively few (about 10%).

Ovipositing and pollinating will commence when the wasp has entered and proceed for some hours. If there are other insects also there, she will not be disturbed, but her ovipositing will be restricted. Other species may enter: of these *Crossogaster odorans* is the most common. Less common is *Phagoblastus barbarus*. Recently, it was published that a species of *Phagoblastus* pollinates the flowers of *Ficus vogelii* (Miq.) Miq. in Ghana, although it is not as efficient as is the Agaonid (*Allotriozoon heterandromorphum* Grandi). According to Newton & Lomo (1979: 29) this relative ineffectiveness of the *Phagoblastus* probably results from two factors. One is that the only pollen carried into the fig by the female wasp is that adhering to the outside of her body. The other factor is that transfer of pollen from the insect's body to the synstigma is probably a matter of chance, brought about as the insect crawls around. In *Ficus thonningii*, pollination is a deliberate act by the *Elisabethiella* and she carries the pollen in special pockets (fig. 5). After pollination, she cannot leave the fig, due to the arrangement of the ostiole, however, she has only a short time to live. Nematodes inside her will feed on her remains, growing rapidly to about 0.7 mm. They emerge from the gastral end as a number of large nematodes, twisted together, and inert. The species was recently described as *Parasitodiplogaster sycophilon* Poinar (1979). A general account on figs and nematodes was published by Martin et al. (1973).

Next to *Elisabethiella stuckenbergi*, there are two other Agaonids entering the receptacle in stage B, viz., *Alfonsiella brongersmai* and *longiscapa*. They may be lodgers in the fig, just as are the *Crossogaster* and *Phagoblastus*, and pollinate only occasionally. They have functional pollen pockets and pollen can sometimes be seen in them, but nothing is known of their behaviour. It is known for the *Elisabethiella*: while continuing oviposition, she periodically will stretch forward both head and thorax, and at the same time fold the legs back so that the feet touch the edges of the pollen pockets. It can be seen from the side that the thorax, which is normally arched, flattens out, drawing the coxae of the front legs forward and exposing the pockets. It is presumed that the pollen removed from the pockets with the feet is then applied to the stigmal surfaces as she rubs the feet about. The action may be done once, or repeated a number of times before pausing. Thus, five species are found to oviposit inside the fig, viz.,

Elisabethiella stuckenbergi (Grandi)

Alfonsiella brongersmai Wiebes

Alfonsiella longiscapa Joseph

Crossogaster odorans Wiebes

Phagoblastus barbarus Grandi

¹) General reference is here made to a series of papers by Galil and collaborators on the pollination of figs (review in Galil, 1977). Some of the terms used in the present paper were taken from Galil et al., as are the indications of the developmental stages of the receptacle.

The fig develops inwards. — After pollination, the florets and galls enlarge, completely filling the space, and crushing the remains of the insects. In this state, the nematods may be overlooked, but if the fig is cut up and placed in water, they can be found.

A number of species of chalcids oviposit through the skin of the fig. They have various methods of forcing the ovipositor through the hard receptacle, as described by several authors (review in Wiebes, 1977: 224—227, fig. 8). Some are evidently adapted to this task by the structure of their ovipositing organs, which they can raise high over the substratum, or they can guide the ovipositor by the long valves. Other species are quite normal and have their ovipositor concealed in the gaster. Some are known to behave as the cuckoo and have been termed “cleptoparasites”. They lay their eggs later than the wasps that enter the fig, and they tend to emerge before, so their rate of development is faster. They cannot themselves cause the florets to develop, so have to rely for their larval food on one already started. Some take only plant tissue prepared by the Agaonid, e.g. this is known for *Philotrypesis caricae* (L.) from the Common Fig. Other species are supposed, by their being noticeably smaller than the other wasps, to be parasitoids of any of the other larvae, killing it and eating its body contents. The following is a list of those to be found ovipositing from the outside:

<i>Philotrypesis parca</i> Wiebes	<i>Ficomila curtivena</i> Bouček
<i>Watshamiella alata</i> Wiebes	<i>Ficomila gambiensis</i> (Risbec)
<i>Sycoscapter cornutus</i> Wiebes	<i>Sycophila kestraneura</i> (Masi)
<i>Sycoryctes remus</i> Wiebes	<i>Sycophila punctum</i> Bouček
<i>Sycoryctes hirtus</i> Wiebes	<i>Sycophila sessilis</i> Bouček
<i>Otitesella tsamvi</i> Wiebes	<i>Sycophila modesta</i> Bouček
<i>Sycotetra serricornis</i> Bouček	<i>Sycophila naso</i> Bouček
<i>Camarothorax equicollis</i> Bouček	<i>Sycophila flaviclava</i> Bouček
<i>Camarothorax longimucro</i> Bouček	<i>Ormyrus watshami</i> Bouček
<i>Camarothorax brevimucro</i> Bouček	<i>Ormyrus flavipes</i> Bouček
<i>Eurytoma ficusgallae</i> Bouček	<i>Ormyrus subconicus</i> Bouček
<i>Syceurytoma ficus</i> Bouček	

It should be stated that we found it difficult to draw a line between the obligatory fig wasps and those which apparently have a looser or even very loose association with the figs. We have included in the study the chalcids which frequently occur in the galled receptacles, whether these finally develop into normal or subnormal syconia. However, there are a number of other insects that use figs as a suitable niche, but are not closely associated with them. Even if they are sometimes present in considerable numbers, as e.g., parasites of dipterous eggs deposited into the tissues of the fig, or of other insects using the fig in a similar way, they are regarded as being out of the scope of this paper. The chalcids associated with such facultative inhabitants of the figs belong mostly to the genera *Eupelmus* Dalman, *Anastatus* Motschulsky, *Pediobius* Walker, *Tetrastichus* Haliday, etc.

The fig grows outwards. — As the fig grows, the central space will be formed again. This allows more freedom of movement. Nematode eggs can be found between the bracts of the florets. Inside the eggs, the juvenile nematode can be

seen sliding about. As the space is formed in the centre of the fig, the male insects start to emerge from their galls. This can be encouraged by opening the nearly developed fig.

The male *Elisabethiella* makes an opening in his gall and sits on the edge of the gall. He looks with the aid of his antennae for galls containing females of his species, which are usually in one region. There is probably something in them that attracts him, as he will continue to open a female gall even when she has been removed. He bites a hole in the female gall and inserts the tubular segments of his gaster and mates. This process takes about half a minute from finding to insertion. He continues looking for females.

Other wingless males emerge at the same time. These leave their own galls and go in search of the females: in the species which oviposit from the outside, perhaps they are more scattered than the *Elisabethiella*, and so need to be looked for. The males bite an opening into the female gall and slip in to mate with her inside. This behaviour may be different for the different species, but this can be more easily studied now they have been distinguished and described.

As the males are very similar to each other, and differ completely from the females, in most cases it was necessary to collect mating pairs. As each pair mated, they were collected. The winged females can be collected on forceps and presented to the males. The other species will reject them, while the correct one will stroke her face and then mount and mate. Later in this stage (fig. 6, D), the *Elisabethiella* males make several openings in the receptacle and the females start to leave.

When the *Elisabethiella* female crosses an anther, she is stimulated to collect pollen. She rubs her fore legs as though wiping the feet on a mat, and raises them to place the pollen into the pockets. After having crawled out of the receptacle, she flies off. The complete cycle may take about 50 to 60 days, though it is variable. *Ficus capensis* Thunb. takes about this time, and it is quite easy to find fruit at different stages, most of the year. The *Ficus burkei* seems to have a similar lot of fruit available, but it is not always so easy to find. At certain times there is much ripe fruit and many thousands of insects are emerging, but it is difficult to find any trees with young fruit that would receive these insects. This may be due to the fact that trees are cut for firewood. A careful search will reveal fruit at different stages of development.

Nematodes can be seen in the newly emerged insects. At first they are crawling over the insects in the moist conditions of the fig. More than twenty can be seen easily. If the emerged insects are kept for a day in a plastic bag, fewer nematodes are seen on the outside, and some are found inside the thorax (sometimes in the pollen pockets) and gaster. They can be seen moving about, displacing the contents of the gaster. At this time they are about 0.4 mm long.

The final ripening of the fig fruit. — According to Galil et al. (1973) opening of the figs allows an increase of ethylene, which encourages the final ripening of the fruit. So the insects are protected while they remain in the fig and no emergence holes have yet been made. Once the insects emerge, the fig begins to ripen and birds such as Glossy Starlings and other fruit-eating birds, also the Fruit Bats, feed on the ripe figs and aid in the dispersal of the seeds.

Other insects are to be found in the fig, but they are not concerned with the cycle of the fig. These include Lepidoptera, weevils (Coleoptera) and several Hemiptera. Diptera that are interested in ripening fruit may also be found (see an interesting paper by Lachaise, 1977).

THE FIG WASP FAUNA FROM *FICUS THONNINGII* COMPARED WITH THAT FROM OTHER FIGS

The main purpose of the present paper is to give a survey of all chalcids reared from one species of fig, in order to make their symbioses open to further research. Compared to what we know of the entomofauna associated with other species of *Ficus*, that of *Ficus thoningii* is now the best known, while that of the Indian *Ficus benghalensis* is the next best. In general, however, our knowledge of the fig-fauna is scanty: hopefully, our survey will persuade other entomologists to study the wasps of figs within their reach.

In table 1 a survey is presented of selected figs and their chalcid fauna. Most sections of Old World *Ficus* (see Corner, 1965) are represented, but five had to be excluded for lack of relevant data (viz., *Stilpnophyllum* Endl., *Rhizocladus* Endl., *Kalosyce* (Miq.) Corner, *Sinosycidium* Corner and *Adenosperma* Corner). In the accompanying list, the references are given that can not be found in the host catalogue (Wiebes, 1966 b). The data lead to the following conclusions. Generally, the Agaonid genera, or in some instances species-groups, are specific to their host-section(s): members of the subfamily Agaoninae are restricted to two sections of *Ficus*, the African representatives of which also harbour Sycoeciinae (but see Wiebes, 1974 b for the Indo-Malayan relatives). The Sycophagini (one species of *Parakoebelia* excepted, see Joseph, 1957: 100) and the Apocryptini are restricted to figs pollinated by *Ceratosolen*. The Otitesellinae (with very few exceptions, not listed; see Wiebes, 1974 d) are restricted to the sections of subgenus *Urostigma* and to section *Oreosyce*.

Special attention is drawn to cases where more than one Agaonid are present (nos. 18, 19, 35, 36, 78), where several species of parasitic wasps are present (nos. 8, 17, 41, 45, 48, 49, 50), or where one species was recorded from different species of *Ficus* (nos. 71, 77; 47, 84; 48-2, 85; 49-5, 86). The list is not in all instances definitive because some of the groups mentioned are still in need of revision.

I. Section *Urostigma* (Gasp.) Miq.

Ficus religiosa L. (see Wiebes, 1967: 419—434): 1, *Platyscapa quadraticeps* (Mayr) (Wiebes, 1977 b: 214); 2, *Philotrypes anguliceps* (Westwood) (Abdurahiman & Joseph, 1975 b: 78); 3, *Sycoryctes religiosae* Wiebes; 4, *Sycoscapteridea monilifera* (Westwood); 5, *Watshamiella infida* Wiebes*; 6, *Eurytoma* spec.

II. Section *Conosyce* (Miq.) Corner

Ficus benghalensis L. (see Wiebes, 1967: 400—419): 7, *Eupristina masoni* Saunders; 8, *Philotrypes transiens* (Walker) & *affinis* (Westwood); 9, *Sycoscapter stabilis* (Walker) (*S. insignis* Westwood, 1883: 35, ♂; *Indothymus crenulatus* Joseph, 1953: 77, ♀); 10, *Sycoryctes* spec.; 11, *Sycoscapteridea gurui* Joseph & Abdurahiman (1969: 42); 12, *Micranisa pteromaloides* (Walker); 13, *Walkerella temeraria* Westwood (Joseph & Abdurahiman, 1969: 44); 14, *Sycobia bethyloides* Walker; 15, *Sycophilodes moniliformis* Joseph; 16, *Sycophilomorpha saptapurensis* Joseph & Abdurahiman

Table 1. Groups and selected genera of fig insects, with the *Ficus* species from which they were reared.

		Ficus:													
Fig wasps:		religiosa	benghalensis	stipenda	macrophylla	eritobotryoides	thomningii	callosa	narica	escapata	latarfolia	nota	variegata	racemosa	eycomorus
Blastophaginae	Platyscapa	1	.	.	.	.	.	.	.	.	.	.	.	.	.
	Eupristina	.	7	.	.	.	.	.	.	.	.	.	.	.	.
	Waterstoniella	.	.	18	.	.	.	.	.	.	.	.	.	.	.
	Blastophaga	.	.	19	.	.	.	.	55	.	.	.	.	.	.
	Dolichoris	.	.	.	.	.	.	51	.	.	.	.	.	.	.
	Kradibia	.	.	.	.	.	.	.	.	58	61	.	.	.	.
	Ceratosolen	.	.	.	.	.	.	.	.	.	.	63	68	72	78
Agaoninae	Pleistodontes	.	.	.	25	.	.	.	.	.	.	.	.	.	.
	Allotrioaon	.	.	.	.	29	.	.	.	.	.	.	.	.	.
	Elisabethiella	.	.	.	.	.	35	.	.	.	.	.	.	.	.
	Alfonsiella	.	.	.	.	.	36	.	.	.	.	.	.	.	.
Sycoecinae	Crossogaster	.	.	.	.	.	37	.	.	.	.	.	.	.	.
	Phagoblastus	.	.	.	.	.	38	.	.	.	.	.	.	.	.
Sycophagini	Sycophaga	.	.	.	.	.	.	.	.	.	.	.	.	.	79
	Eukoebelea	.	.	.	.	.	.	.	.	.	.	64	69	73	80
	Parakoebelea	.	.	.	.	.	.	.	.	.	.	.	.	74	81
	Idames	.	.	.	.	.	.	.	.	.	.	.	.	75	82
Apocryptini	Apocrypta	.	.	.	.	.	.	.	.	.	.	65	.	76	83
Philotrypesini	Philotrypesis	2	8	.	26	30	39	.	56	59	.	66	70	.	.
	Sycoscapter	.	9	20	.	31	40	.	.	.	62	.	.	.	.
	Arachonia	.	.	21	.	.	.	.	.	.	.	.	.	.	.
Sycoryctini	Sycoryctes	3	10	22	27	32	41	52	.	.	.	67	71	77	.
	Sycorycteridea	.	.	.	.	.	.	53	.	.	.	.	.	.	.
	Sycoscapteridea	4	11	.	.	.	.	.	57	60	.	.	.	.	.
	Watshamiella	5	.	23	.	.	42	.	.	.	.	.	.	.	.
	Otitesella	.	.	.	.	33	43	.	.	.	.	.	.	.	.
Otitesellinae	Micranisa	.	12	.	.	.	.	.	.	.	.	.	.	.	.
	Walkerella	.	13	.	.	.	.	.	.	.	.	.	.	.	.
	Grandiana	.	.	24	.	.	.	.	.	.	.	.	.	.	.
	Grasseiana	.	.	.	.	.	.	54	.	.	.	.	.	.	.
Epichrysomallinae	Sycobia	.	14	.	.	.	.	.	.	.	.	.	.	.	.
	Pembertonia	.	.	.	28	.	.	.	.	.	.	.	.	.	.
	Sycophilodes	.	15	.	.	.	.	.	.	.	.	.	.	.	.
	Sycophilomorpha	.	16	.	.	.	.	.	.	.	.	.	.	.	.
	Sycotetra	.	.	.	.	.	44	.	.	.	.	.	.	.	.
Eurytominae	Camarothorax	.	.	.	.	34	45	.	.	.	.	.	.	.	.
	Eurytoma	6	.	.	.	.	46	.	.	.	.	.	.	.	.
	Sycoeurytoma	.	.	.	.	.	47	.	.	.	.	.	.	.	84
	Ficomila	.	.	.	.	.	48	.	.	.	.	.	.	.	85
	Sycophila	.	17	.	.	.	49	.	.	.	.	.	.	.	86
Ormyrinae	Ormyrus	.	.	.	.	.	50	.	.	.	.	.	.	.	.

(1969: 37); 17, *Sycophila decatomoides* Walker and other species (? *Decatoma*, Joseph & Abdurahiman, 1968).

Ficus stipenda Miq. (see Wiebes, 1966 b: 163—192): 18, *Waterstoniella masii* (Grandi); 19, "Blastophaga" errata Wiebes; 20, *Sycooscapter reticulatus* Wiebes; 21, *Arachonia borneensis* Wiebes; 22, *Sycoryctes hilli* Wiebes; 23, *Watshamiella stilifera* (Wiebes)*; 24, *Grandiana corneliae* Wiebes.

III. Section *Malvanthera* Corner

Ficus macrophylla Desf. ex Pers.: 25, *Pleistodontes froggatti* Mayr; 26, *Philotrypesis aterrima* Saunders; 27, *Sycoryctes australis* (Froggatt); 28, *Pembertonia ficicola* Gahan.

IV. Section *Galoglychia* (Gasp.) Endl.

Ficus cf. *eriotryoides* K. & B. (see Wiebes, 1971: 367—383): 29, *Allotriozone prodigiosum* Grandi; 30, *Philotrypesis finitimorum* Wiebes; 31, *Sycoscapter montis* Wiebes; 32, *Sycoryctes lomaensis* Wiebes; 33, *Oritesella royi* Wiebes; 34, *Camarothorax africanus* (Wiebes)*.

Ficus thonningii Bl. (present paper): 35, *Elisabethiella stuckenbergi* (Grandi); 36, *Alfonsiella brongersmai* Wiebes & *longiscapa* Joseph; 37, *Crossogaster odorans* Wiebes*; 38, *Phagoblastus barbarus* Grandi; 39, *Philotrypesis parca* Wiebes*; 40, *Sycoscapter cornutus* Wiebes*; 41, *Sycoryctes remus* Wiebes* & *hirtus* Wiebes*; 42, *Watshamiella alata* Wiebes*; 43, *Oritesella tsamvi* Wiebes*; 44, *Sycotetra serricornis* Bouček*; 45, *Camarothorax equicollis* Bouček*, *longimucro* Bouček* & *brevimucro* Bouček*; 46, *Eurytoma ficusgallae* Bouček*; 47, *Syceurytoma ficus* Bouček*; 48, *Ficomila curtivena* Bouček* & *gambiensis* (Risbec)*; 49, *Sycophila kestraneura* (Masi)*, *punctum* Bouček*, *sessilis* Bouček*, *modesta* Bouček*, *naso* Bouček* & *flaviclava* Bouček*; 50, *Ormyrus watshami* Bouček*, *subconicus* Bouček* & *flavipes* Bouček*.

V. Section *Oreosycea* (Miq.) Corner

Ficus callosa Willd.: 51, *Dolichoris malabarensis* (Abdurahiman & Joseph) (Wiebes, 1979 a: 188); 52, *Sycoryctes callosa* Abdurahiman & Joseph (1975 a: 103); 53, *Sycorycteridea keralensis* Abdurahiman & Joseph (1975 a: 99); 54, *Grasseiana callosa* Abdurahiman & Joseph (1967: 14).

VI. Section *Ficus* L.

Ficus carica L.: 55, *Blastophaga psenes* (L.); 56, *Philotrypesis caricae* (L.); 57, *Sycoscapteridea raoi* Joseph.

VII. Section *Sycidium* Miq.

Ficus exasperata Vahl: 58, *Kradibia gestroi* (Grandi) (Wiebes, 1978 a: 176); 59, *Philotrypesis quadrisetosa* (Westwood); 60, *Sycoscapteridea longipalpus* (Joseph).

Ficus laterifolia Vahl: 61, *Kradibia cowani* Saunders (Wiebes, 1978 a: 174); 62, *Sycoscapter gibbus* Saunders (Wiebes, 1978 b: 187).

VIII. Section *Sycocarpus* Miq.

Ficus nota (Blanco) Merr.: 63, *Ceratosolen notus* (Baker); 64, *Eukoebelea nota* (Baker); 65, *Apocrypta larvalis* (Baker); 66, *Philotrypesis similis* Baker; 67, *Sycoryctes bakeri* Wiebes.

IX. Section *Neomorpha* King

Ficus variegata Bl.: 68, *Ceratosolen appendiculatus* (Mayr); 69, *Eukoebelea spinatarsus* (Mayr); 70, *Philotrypesis bimaculata* Mayr; 71, *Sycoryctes patellaris* Mayr.

X. Subgenus *Sycomorus* (Gasp.) Miq.

Ficus racemosa L.: 72, *Ceratosolen fusciceps* (Mayr); 73, *Eukoebelea brevitarsis* (Grandi); 74, *Parakoebelea stratheni* Joseph; 75, *Idarnes testacea* (Mayr); 76, *Apocrypta westwoodi* Grandi; 77, *Sycoryctes patellaris* Mayr.

Ficus sycomorus L. (see Wiebes, 1968: 307—320): 78, *Ceratosolen arabicus* Mayr & *galili* Wiebes; 79, *Sycophaga sycomori* (L.); 80, *Eukoebelea sycomori* Wiebes; 81, *Parakoebelea gigas* (Mayr); 82, *Idarnes gracilis* Wiebes; 83, *Apocrypta longitarsus* Mayr; 84, *Syceurytoma ficus* Bouček*; 85, *Ficomila gambiensis* (Risbec)*; 86, *Sycophila naso* Bouček*.

REFLECTIONS ON THE CLASSIFICATION OF CHALCIDOID FIG WASPS

It is still rather premature to give proper taxonomic assignment of most

* New species or new combination published in the present paper.

chalcidoid groups associated with the figs, to the families as they are recognised today. It can be said that the closer is this association, the more difficult it is to trace the links with the most closely related non-fig-associated groups. Despite certain controversies most authors agree that the genus *Ficus* was already present and abundant in the Cretaceous period. However, there is but one fossil record of an Agaonid (Brues, 1910) and also records of the other Chalcidoidea are very scanty, especially of the groups of the "pteromaloid complex", i.e., families most closely related to Pteromalidae, including Torymidae, Eurytomidae and Agaonidae. So far the main source has been an analysis of the morphological characters, supplemented by some biological evidence. This analysis seems to suggest that at least some of the relevant groups have nothing to do with the Torymidae under which most of the fig wasps (apart from Agaonidae) have been recently classified.

Agaonidae are best regarded as a separate family. However, it seems possible that the "unplaced" Sycoecinae are related to them, probably as a plesiomorphic (less specialised) group, pointing perhaps to a common origin of both groups in the pteromaloid complex. All the same it must be stressed that a placement of Sycoecinae in Agaonidae is still very problematic.

Apart from the neotropical genus *Physothorax* Mayr, which undoubtedly belongs to Torymidae, subfamily Toryminae, two other groups seem to have closer links with Torymidae, viz., Apocryptini and Sycophagini. They might be regarded as two tribes of a special subfamily Sycophaginae. Another, but more questionably torymid subfamily may constitute the Sycoryctinae. They may include two tribes, Sycoryctini (here also the neotropical *Critogaster* Mayr) and Philotrypesini. Both are undoubtedly closely related, but there are almost as many reasons to classify them under Pteromalidae as are in favour of the Torymidae.

A few further groups seem to be placed best in the family Pteromalidae. Here belong Otitesellinae which include, apart from several palaeotropical genera (listed e.g., in Hill, 1967) also the neotropical *Aepocerus* Mayr and *Heterandrium* Mayr. Yet another pteromalid subfamily, although completely different from Otitesellinae, may be Epichrysomallinae. They may retain the subfamily status, being sufficiently different from, although related to, the Brachyscelidiphaginae (*Epichrysomalla* Girault was originally described along with several genera of the latter group), possibly as their apomorphic sister group, as suggested by *Leeweniella* Ferrière. Both groups are of phytophagous habits, but Epichrysomallinae are associated exclusively with figs (palaeotropical), galling the female florets as do the Agaonidae, but apparently ovipositing through the fig wall. Otherwise the coiled ovipositor reminds us much of certain Eurytomidae. However, Epichrysomallinae do not seem to be closely related to the eurytomids, as found independently, on other evidence, also by M. Copland (*in litt.*).

The remaining groups Eurytomidae and Ormyridae do not pose many problems, but it should be noted that the latter group shows close relationship with Torymidae and should perhaps be better regarded as a subfamily of Torymidae, as they were in the past.

Thus, in the present paper the following classification is used:

Family	Subfamily	Tribe
Agaonidae	Agaoninae	
	Blastophaginae	
(not placed)	Sycoecinae	
Torymidae	Toryminae	
	Sycophaginae	Sycophagini
		Apocryptini
	Ormyrinae	
Torymidae	Sycoryctinae	Philotrypesini
or Pteromalidae		Sycoryctini
Pteromalidae	Otitesellinae	
	Epichrysomallinae	
Eurytomidae	Eurytominae	

In the following descriptive part, the groups are treated in the sequence of the above classification, which is that given by their association with the figs; for the reason of their rather loose association with *Ficus*, however, the Ormyrinae are treated last. The Blastophaginae and Sycophaginae are not represented in *Ga-loglychia*-figs, as is evident from table 1.

KEY TO THE FIG WASPS FROM *FICUS THONNINGII*

1. Fully winged, females and males 2
- Apterus or brachypterous, males only 36
2. Females: gaster with distinct tail formed either by the ovipositor and its sheaths, or also by extremely narrowed last one or two tergites 3
- Females without such a slender tail: ovipositor sheaths short, hardly exerted; or males, i.e., with last sternite virtually reaching apex of gaster 12

WINGED FEMALES WITH TAILS

3. Narrow gastral tail formed for a great part by one or two ultimate tergites ... 4
- Last tergite short, tail formed by the ovipositor and its sheaths 8
4. Tail formed in anterior part by two ultimate tergites (the proximal of which is recognizable by the very small spiracular peritremes) and, in hinder portion, by long protruding ovipositor and sheaths (Philotrypesini) *Philotrypesis parca*
- Tail formed by the last tergite, i.e., the apparent gaster ending with the eighth urotergite, which bears the spiracular peritremes (Sycoryctini) 5
5. Stigmal vein produced into a boot-like stigma (fig. 64), the fore wing with long setae in the marginal-stigmal angle; the epistomal margin produced into an acute projection (fig. 65) *Sycoscapter cornutus*
- Stigmal vein more normal, the wings at most with some long setae along the veins (but may be pilose all over); the epistomal margin straight or with wide lobes 6
6. Epistomal margin widely lobed (fig. 68); the wings hyaline but for some

- setae along the veins (*Sycoryctes*) 7
- Epistomal margin straight (fig. 62); the wings evenly pilose *Watshamiella alata*
7. The legs up to and including the tibiae dark *Sycoryctes remus*
- The legs from the femora onwards yellowish *Sycoryctes hirtus*
8. Antennal scape strongly broadened; prognathous head with mandibles provided with a denticulate appendage; marginal vein normal and slender, postmarginal short but not rudimental (Agaoninae) 9
- Antenna of more normal form; mandibles without such appendage, although they bear teeth directed backwards; marginal vein thickened and longer than rudimental postmarginal (Sycoecinae) 11
9. Funicular segments of antenna with sensilla linearia. General aspect, fig. 5 *Elisabethiella stuckenbergi*
- Funicular segments of antenna with long flexible sensilla chaetica (*Alfonsiella*) 10
10. Head scarcely longer than wide (fig. 14), mandibular appendage with twenty ventral rows of teeth; antennal scape not produced. *Alfonsiella brongersmai*
- Head distinctly longer than wide (fig. 15), mandibular appendage with thirty-five ventral rows of teeth; antennal scape with an apical process. *Alfonsiella longiscapa*
11. Antenna with one anellus, funicle with long sensilla chaetica; fore tibia with a dorso-apical, bidentate hook *Crossogaster odorans*
- Antenna with two anelli, funicle with sensilla linearia; fore tibia with a comb of conical teeth *Phagoblastus barbarus*

WINGED FEMALES WITHOUT TAILS AND WINGED MALES

12. Gaster with at least some coarse sculpture; marginal vein very long, at least seven times as long as short stigmal vein; antenna thirteen-segmented, with two anelli (Ormyrinae) 13
- Gaster without any coarse sculpture, either smooth or virtually so; marginal vein never so much longer than the stigmal vein 15
13. Mid lobe of mesoscutum in both sexes mainly bare, pilosity reduced to few dark bristles on posterior half; in ♀ gaster mostly not longer than head plus thorax combined, dorsally keeled; femora and tibiae dark; in ♂ legs and sides of thorax testaceous, gaster flat and shiny, two middle tergites usually each with two exposed rows of deep foveolae *Ormyrus watshami*
- Mesoscutum (and scutellum) all over with regular subdecumbent pilosity; other characters also partly different 14
14. Femora and tibiae in both sexes testaceous; in ♀ gaster anteriorly rather high, compressed, but its apical third (from middle of sixth tergite) abruptly narrowed and slightly upturned; middle tergites each with a row of raised short ridges but deep foveolae at base of tergites often concealed; in ♂ gaster slightly dull (also between foveolae), fairly densely punctulate *Ormyrus flavipes*
- Femora, sometimes also tibiae, in both sexes more or less infuscate and

- pedicellus slightly shorter than in alternate; in ♀ gaster not high, almost gradually tapering, subconical, usually tergites 3 to 5 with exposed deep foveolae at base, just in front of serrate rows of short ridges; in ♂ gaster with distinct smooth interspaces between deep foveolae ... *Ormyrus subconicus*
15. Body with metallic gloss, very finely reticulate; in ♀ apex of gaster slightly curving ventrad (Otitesellinae) *Otitesella tsamvi*
- Body non-metallic, frequently either almost smooth or with distinct sculpture on thorax and mostly also on head; apex of gaster in ♀ often curving dorsad, never ventrad 16
16. Thorax (and head) with distinct sculpture and pubescence; stigmal vein usually at acute angle or short marginal vein distinctly expanded (Eurytomiinae) 17
- Body without distinct sculpture, although often microscopically alutaceous; thorax always with pubescence reduced to pairs of bristles; marginal vein not so short or, if so, then stigmal vein arising at nearly right angle 26
17. Gena posteriorly with strong and distinctly raised carina extending up the temple; thorax densely umbilicately punctured 18
- Gena posteriorly with an edge which is blunt or at most indistinctly carinate in middle or at mandible; umbilicate punctures, if present on thorax, usually not very dense 19
18. Marginal vein distinctly swollen; gaster on distinct petiole which has anteriorly a transverse crest; fore coxa antero-ventrally flat; mesosternal shelf very short, in middle with small rounded projection which is hollowed from both sides; genal carina smoothly joining mouth margin; body usually extensively rufous, in darkest specimens at least ventrally .. *Syceurytoma ficus*
- Marginal vein normal, slender; gaster in ♀ virtually sessile; fore coxa on antero-ventral surface with strong oblique carina; mesosternal shelf separated by sinuate cross-carina; genal carina with a tooth at base of mandible; body black, legs beyond coxae usually orange *Eurytoma ficusgallae*
19. Mesosternal part of thorax with distinct though not high median projection excavated from the sides and, sublaterally, with slight carina marking off mesosternal shelf; marginal vein in ♀ not longer than stigmal vein which is usually distinctly curved; wing sometimes without fuscous spot (macula) (*Ficomila*) 20
- Mesosternum regularly sloping, posteriorly with median hairy depression (at mid coxae), but without any indication of delimited mesosternal shelf; marginal vein always with fuscous macula and frequently longer than the stigmal vein (*Sycophila*) 21
20. In ♀ gaster dorsally broad, with fourth tergite about twice as long as the third; thorax dorsally almost always black, with dense umbilicate puncturation and conspicuous white pubescence; fore wing whitish, without infusate macula, its pilosity, including marginal fringe, very short, inconspicuous; ♂ unknown *Ficomila curtivena*
- In ♀ gaster compressed from sides, dorsally subcarinate, its fourth tergite hardly longer than the third; thorax usually yellowish, its pilosity and puncturation often not conspicuous; fore wing with small fuscous macula on marginal vein *Ficomila gambiensis*

21. Pedicel in both sexes distinctly shorter than first funicular segment; marginal vein swollen, i.e. with its lower margin convex, often strongly so (in dark larger ♂); in ♀ wing below submarginal vein bare or with up to 2 hairs and petiole distinctly elongate (about 1.5×1), gaster compressed, dorsally keeled *Sycophila kestraneura*
- Pedicel nearly as long as or even longer than first funicular segment; marginal vein widening distad but its lower margin (sometimes obscured by macula) either straight or even concave; partly different also in other characters 22
22. Exposed part of prepectus with some hairs (fig. 144); in ♀ wing below submarginal vein bare or with up to 2 hairs only; marginal vein only moderately widened and rather short, macula small, usually round and not reaching base of marginal vein; in ♂ head subglobose, stout, 1.5—1.65 times as broad as long in dorsal view *Sycophila punctum*
- Prepectus completely bare (occasionally with 1—2 hairs in *sessilis*); in ♀ wing below submarginal vein at least with a sparse hairline on basal fold; in ♂ head more transverse than in alternate 23
23. Gaster in ♀ virtually sessile (fig. 148) as dorsal part of petiole is strongly transverse; ♂ unknown *Sycophila sessilis*
- Gaster distinctly petiolate in both sexes, petiole in ♀ mostly elongate in dorsal view 24
24. Malar space slightly shorter than, or at most virtually as long as half of longest diameter of eye, lower extremity of eye subangular (fig. 150); in ♀ antenna darkened but with yellow apex; interantennal crest rather steep into scrobal cavity *Sycophila flaviclava*
- Malar space at least slightly longer than half of longest eye diameter, eye broadly rounded in lower part (figs. 149, 151, 152); antenna in ♀ uniformly darkened, not yellow at apex 25
25. Fore wing on dorsal surface of costal cell in ♀ with distinct row of erect hairs; interantennal crest gradually descending into scrobal cavity; ♀ gaster usually with darker bands on anterior tergites; pedicel at most about 2.2 times as long as broad *Sycophila modesta*
- Dorsal surface of costal cell in ♀ bare or at most with odd hair; interantennal crest mostly perpendicularly descending into scrobes, forming a subrectangular tooth; ♀ gaster usually unicoloured, yellowish or blackish; pedicel in both sexes with flat dorsal outline, usually more than $2\frac{1}{2}$ times as long as broad *Sycophila naso*
26. Only males: fore wing wholly pilose, narrow, marginal vein very long and postmarginal fully twice as long as the stigmal; antennal flagellum not or hardly longer than scapus *Watshamiella alata*
- Both sexes; in male venation different, wing at base extensively bare, flagellum longer 27
27. Only males: marginal vein thickened and at least 1.9 times as long as the stigmal, wing in area below marginal vein and parastigma pubescent; head flat, with long mandibles (Sycoecinae) 28
- Both sexes: in male marginal vein not so long and thickened, area below this vein at least partly bare; head different (Epichrysomallinae) 29

28. Head virtually as long as wide, with antennal toruli partly below lower ocular line; marginal vein fully twice as long as the stigmal; outer tooth of mandible shorter than the inner tooth (fig. 36) *Crossogaster odorans*
- Head slightly but distinctly longer than wide, with antennal toruli distinctly above ocular line; marginal vein not quite twice as long as the stigmal; outer tooth of mandible longer than inner tooth (fig. 37) .. *Phagoblastus barbarus*
29. Tarsi 4-segmented; notauli very superficial, in form of dark lines not nearly reaching transscutal line; scutellum anteriorly separated from axillae only by lines, not by grooves; funicular segments in both sexes separated by distinct incisions, in ♀ funicle serrate and 6-segmented, in ♂ 5-segmented *Sycotetra serricornis*
- Tarsi 5-segmented; notauli groove-like, complete or nearly so (some ♂); axillar grooves also complete; flagellar segments in ♀ never serrate, flagellum fairly compact and sometimes with different number of segments; in ♂ funicle either with 5 or 7 segments (*Camarothorax*) 30
30. Females (gaster compressed, high, dorsally keeled) 31
- Males (gaster flat, much shorter than thorax) 33
31. Antenna with 7 funicular segments plus small anellus; pedicel subglobose *Camarothorax equicollis*
- Only 6 funicular segments, a small anellus and an elongate pedicel (at least 1.6×1) 32
32. Gaster strongly compressed, about as long as head plus thorax, its hypopygium not quite reaching two-thirds along ventral edge but bearing at apex a long thin whitish projection; clypeus dorsally separated from supraclypeal area by distinct line *Camarothorax longimucro*
- Gaster relatively broader and only about as long as thorax, hypopygium reaching near to apex of gaster and bearing a short projection; clypeus dorsally not separated from supraclypeal area .. *Camarothorax brevimucro*
33. Antenna with 5 funicular segments; clypeus not separated dorsally from supraclypeal area; body yellowish *Camarothorax brevimucro*
- With 7 funicular segments; clypeus separated dorsally by a dark line from supraclypeal area; body often brownish 34
34. Head and pronotum unusually long, each longer than broad; notaular grooves almost meeting at scutellum *Camarothorax equicollis*
- Head and pronotum shorter, each at least slightly broader than medially long; notauli more apart posteriorly 35
35. Head only slightly broader than long, also pronotum relatively long; body brown, legs partly yellowish (? a form of *Camarothorax equicollis*)
- Head obviously shorter than broad, its genae converging; pronotum transverse; body yellow *Camarothorax longimucro*

APTEROUS MALES

36. Solenogastrous i.e., the last four or five gastral segments tubularly lengthened; antenna reduced to five or six segments (Agaoninae) 37
- Last gastral segments not tubularly lengthened; antenna consisting of at least ten segments 39

37. Antennae situated in a common groove (fig. 7), the club slender, not much wider than the funicle (fig. 10) *Elisabethiella stuckenbergi*
 — Antennae situated in separate sockets, the club much wider than the funicle (fig. 13) (*Alfonsiella*) 38
38. Head rather wide in front, the width just behind the eyes little smaller than the maximum width. General aspect, fig. 13 *Alfonsiella brongersmai*
 — Head distinctly narrowing frontad, the width just behind the eyes four-fifths of the maximum width *Alfonsiella longiscapa*
39. Antennae inserted high on face, at the upper ocular line, their toruli wide apart; tarsi 4-segmented, antennae 10-segmented (*Otitesellinae*)
 *Otitesalla tsamvi*
 — Antennae inserted near to mouth, below lower ocular line; tarsi 5-segmented, antennae consisting of 11 or 12 segments (*Sycoryctinae*) 40
40. Segments of antennal flagellum normal, gradually changing in shape; two basal segments of hind tarsus strongly expanded dorsally; hypostomal margin of characteristic shape: deeply incised between sublateral lobes (fig. 49) (*Philotrypesini*) *Philotrypesis parca*
 — Flagellum with partly alternating larger and smaller segments, especially second funicular segments always smaller than the first; hind tarsus at most with first segment expanded; hypostomal margin at most moderately emarginate (or straight) (*Sycoryctini*) 41
41. Tarsi with enlarged last segment but basal segments small, especially on fore tarsus (fig. 58); antenna 11-segmented *Sycoscapter cornutus*
 — Tarsi different, last segment not greatly enlarged, on hind tarsus first segment distinctly longer than the second; antenna 12-segmented (*Sycoryctes*) 42
42. Head posteriorly with conspicuous cervical shield; head and thorax with abundant pilosity; antennal club usually much darker than the slender funiculus; hind basitarsus at most only moderately broadened
 *Sycoryctus hirtus*
 — Head posteriorly only with the usual raised cross-carina; head and pronotum, apart from usual bristles, nearly glabrous; funicular segments of antenna rather wide, club less distinctly set off, pale; hind basitarsus often greatly enlarged *Sycoryctes remus*

AGAONINAE

In the present material, three species of Agaoninae are represented, viz., two of *Alfonsiella* Waterston and one of *Elisabethiella* Grandi. Evidently, either can act as a pollinator, but the true relationships are not understood.

A key to the African genera of the Agaonidae was published by Wiebes (1974a: 34—36), one to the species of *Elisabethiella* in the same paper (p. 30—31). The species here treated is a member of the species group of *E. enriquesi* (Grandi), with which it will be compared in the description below.

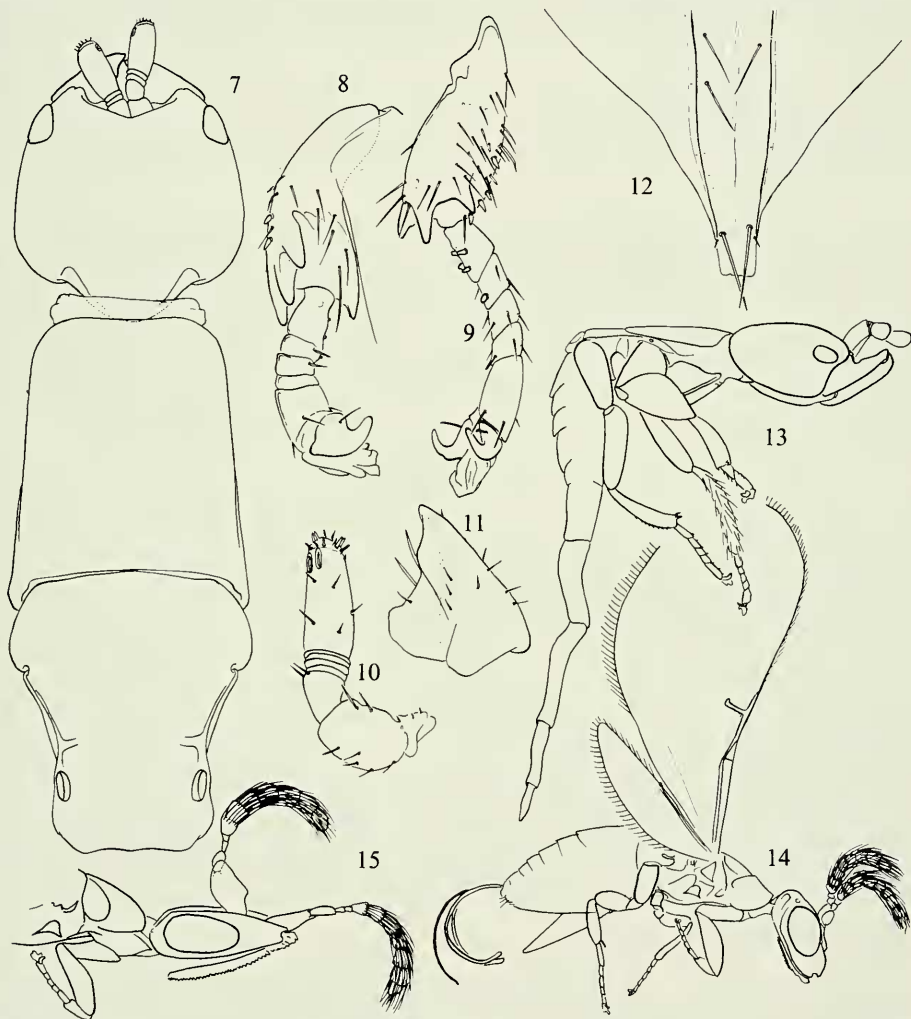
Elisabethiella stuckenbergi (Grandi)

(figs. 5, 7—12; pl. 1 fig. 1, 3)

Blastophaga (*Elisabethiella*) *stückenbergi* Grandi, 1955: 85—87. Holotype ♀, South Africa: Grahamstown (LEB) [examined].

Female. — Length of the head, thorax and gaster ca. 1.4 mm. Colour dark brown to blackish, the antennal scape and the tarsi of the legs lighter.

Head as long as wide across the compound eyes; the eye as long as the cheek. Mandible with five ventral ridges, two apical teeth and two glands; the append-



Figs. 7—12. *Elisabethiella stuckenbergi* (Grandi), female (12) and male (7—11). 7, head and thorax; 8, fore tibia and tarsus; 9, hind tibia and tarsus; 10, left antenna, ventral aspect; 11, left mandible, ventral aspect; 12, hypopygium. Figs. 13—15. *Alfonsiella*, sketches of: 13, male of *A. brongersmai* Wiebes; 14, female of *A. brongersmai* Wiebes; 15, female head and part of thorax of *A. longiscapa* Joseph.

age four times as long as wide, with about twenty rows of ten to twelve denticulations (except for the proximal and distal rows, which have less). Labium with two apical setae, the maxilla with two subapicals. Antenna: the scape three times as long as the rotundate pedicel; the segments, from the fifth onwards, with rather long sensilla covering the whole length of the segment.

Thorax with large mesosternal pollen pockets; shallow coxal corbiculae and a distinct comb. Fore tibia with an apical comb of three teeth and with one ventral tooth and a spur; the tarsal segments approximately in ratio 7 : 3 : 3 : 3 : 6. Mid leg: tarsal ratio 4 : 3 : 3 : 3 : 4. Hind tibia with two bidentate antiaxial and a slender, simple axial teeth; the tarsal segments approximately in ratio 8 : 4 : 3 : 2 : 5. Fore wing (ca. 2 : 1) 1.3 mm long, the submarginal, marginal, stigmal and postmarginal veins approximately in ratio 10 : 2 : 3 : 4; the hind wing (4 : 1) 0.7 mm long.

Gaster: the hypopygium (fig. 12) has a rather short spine with a blunt apex (unknown for *E. enriquesi*). The ovipositor is as long as the body, over two times as long as the gaster (27 : 13).

Male. — Length of the head and thorax ca. 0.9 mm. Colour yellow-brown.

Head (fig. 7) as long as wide; the eye approximately one-fifth of the length of the head. The dorsal surface, especially in the anterior third, has rather stout spines directed backwards. Mandible (fig. 11) with one apical tooth and with one gland; other mouthparts atrophied. Antennae (fig. 10) situated in a common groove; there are five free segments (formula 1121), the third and fourth of which are annuliform; the club is more than twice as long as wide (20 : 9).

Thorax, fig. 7. The pronotum has a distinct collar, the sclerite itself is shorter than the combined lengths of the posterior sclerites (10 : 11) and longer than wide posteriorly (20 : 19). As seen from the lateral indentations, the meso-, metanotum and propodeum are subequal in length; the mesonotum is wider than the metanotum (19 : 14), the propodeum is narrower (12). The spiracles occupy one-third of the length of the propodeum. Fore tibia (fig. 8) with three teeth in a dorso-apical crest and two short conical spines on the dorsal margin, a bidentate ventral apex; the tarsal segments all distinctly separate, approximately in ratio 8 : 3 : 2 : 1 : 7, the first and second with two and one axial cones, respectively. Mid leg: tarsal ratio 6 : 5 : 6 : 5 : 7. Hind tibia (fig. 9) with a bidentate apical crest at the antiaxial disk and a faintly bicuspidate tooth axially (Grandi mentioned a tridentate crest for *E. enriquesi*, which must have been the bidentate crest and the axial tooth seen as one); the tarsal segments approximately in ratio 8 : 5 : 4 : 5 : 10, the basitarsus has four conical spines in two rows (in one line in *E. enriquesi*) and the second has one ventral cone.

Gaster: the genitalia simple.

Material. — Series ♀♂, Zimbabwe-Rhodesia: Makumbi Mission, Chinamora Reserve, ex *Ficus burkei*, xii.1976 (A. Watsham); Salisbury, ex *Ficus burkei*, series ♀♂, ii-v.1977 (A. Watsham). Zambia: Kafue National Park, Ngoma, ex *Ficus burkei*, 6 ♂, 8.xii.1977 (M. G. Bingham, no. 2465); Lusaka, Chelston School, ex *Ficus burkei*, 7.i.1979 (M. G. Bingham, no. 2472); Chipata Golf Course, ex *Ficus burkei*, 14 ♀, 11.i.1979 (M. G. Bingham, no. 2474); Lusaka,

Cathedral of the Holy Cross, ex *Ficus burkei*, 50 ♀ 50 ♂, 16.ii.1979 (M. G. Bingham, no. 2490). The material is deposited in the RMNH, Leiden, some duplicates are in the BMNH, London and in the Watsham Collection.

Comments. — The number of crenulations in the transverse rows on the mandibular appendage was not clear from Grandi's description of the female; now, the data used in my key (Wiebes, 1974a: 31) prove to be incorrect. The only differential character that remains with the female of *E. enriquesi* is the longer head. The male, too, should be compared with *E. enriquesi* and also with *E. allotriozoonoides* (Grandi), to which Grandi referred when describing *E. enriquesi*. The following couplets have to be inserted into my key to accomodate for the species mentioned.

1. Female: the antennal pedicel angular in outline, longer than wide. Male: the head distinctly longer than wide (7 : 6), the pronotum as long as the composite posterior sclerite. Eritrea, ex *Ficus* spec. *allotriozoonoides*
 — Female: the antennal pedicel rotundate in outline. Male: the head, if at all, only little longer than wide, the pronotum shorter than the posterior sclerite.. 2
2. Female: the head distinctly shorter than wide across the compound eyes (6 : 7). Male: the fore tibia without conical spines on the dorsal margin; the second to fifth tarsal segments fused. Angola, ex *Ficus* spec. *enriquesi*
 — Female: the head as long as wide. Male: the fore tibia with two short conical spines on the dorsal margin; all tarsal segments free. South Africa, Rhodesia and Zambia, ex *Ficus burkei* *stuckenbergi*

Alfonsiella Waterston

There are four described species of *Alfonsiella*, mainly known from light catches. In the present material (which is retained in the RMNH, Leiden for further revision) two species are represented, viz., *A. brongersmai* Wiebes and *A. longiscapa* Joseph, but in different samples. The two species are recognizable by the following characters (Wiebes, 1972).

Female. — Length of the head, thorax and gaster 1—2 mm. Colour yellowish.

Head scarcely longer than wide in *A. brongersmai* (fig. 14), distinctly longer than wide in *A. longiscapa* (fig. 15); the compound eye $1\frac{1}{2}$ —2 times as long as the cheek. Two ocelli. Mandibular appendage with about twenty (*A. brongersmai*) or thirty-five ventral rows of teeth (*A. longiscapa*). Antenna: the scape with an apical process in *A. longiscapa*, without such a process in *A. brongersmai*; the third segments rather simple, the funicular sensoria very long and flexible.

Thorax with mesosternal pollen pockets, and also the fore coxa with a corbiculum. Fore tibia with two dorso-apical teeth and one ventral. Hind tibia with two ventral spurs. Postmarginal vein of fore wing as long or half as long as the stigmal (*A. longiscapa* and *brongersmai*, respectively).

Gaster: the ovipositor about as long as the gaster.

Male. — Length of head and thorax 1 mm. Colour yellowish, but the head may be darker, especially the large mandibles; the mid femur and tibia dark and setose.

Head little longer than wide in *A. brongersmai* (fig. 13), distinctly longer than wide (5 : 4) in *A. longiscapa*; with rather large compound eyes, one-quarter of the length of the head. Mandible heavy, triangular in lateral aspect. Antenna six-segmented (formula 1131).

Thorax consisting of two sclerites. Fore tibia with two dorsal hook-like teeth and one simple ventral, the dorsal edge with conical spines; the tarsus oligomeric. Mid leg strikingly darker than the other legs, the femur and tibia setose. Hind tibia: two ventral spurs, the dorsal margin with conical spines.

Gaster: genitalia simple.

***Alfonsiella brongersmai* Wiebes**

(figs. 13, 14)

Alfonsiella brongersmai Wiebes, 1972: 326. Holotype ♀, Kenia: Nairobi (RMNH, Leiden) [examined].

Material. — Zimbabwe-Rhodesia: Salisbury, ex *Ficus burkei*, 2 ♂, ii.1977 (A. Watsham). Zambia: Chipata, ex *Ficus petersii*, 14 ♀ 6♂, 11.i.1979 (M. G. Bingham, no. 2475); Lusaka, Cathedral of the Holy Cross, ex *Ficus burkei*, 1 ♀, 16.ii.1979 (M. G. Bingham, no. 2490).

***Alfonsiella longiscapa* Joseph**

(fig. 15)

Alfonsiella longiscapa Joseph, 1959: 30. Holotype ♀, Guinea: Mts. Nimba (MNHN, Paris) [examined]; Wiebes, 1972: 328—330.

Material. — Zambia: Luapula Prov., Mununshi Banana Estate, ex *Ficus* cf. *burkei*, 23 ♀ 5 ♂, 9.xii.1978 (M. G. Bingham, no. 2471).

SYCORYCTINI

The Sycoecinae have alate males, and females modified for penetrating the fig ostiole. They are easily distinguished by the wing veins in that the marginal is just longer than the stigmal, and thickened; the postmarginal is subequal to the stigmal but very sharply tapering (Hill, 1967: 98).

Grandi (1955: 101, nota) concluded when making his key to the genera of the Sycoecinae (Sycophagini in his sense, pro parte), that the classification of this group is still unstable. Even now *Lipothymus* Grandi and *Eujacobsonia* Grandi are allocated to the Otitesellinae and *Sycophaga* Westwood to the Sycophagini s. str. (Wiebes, 1966a), there still is some ambiguity in the definitions of *Crossogaster* Mayr and *Phagoblastus* Grandi. Six species are included: *Crossogaster triformis* Mayr (1885: 189—192, figs. 20—22; redescribed by Grandi, 1928: 203—206, figs. xlii-xliii, the apterous male excluded), *Crossogaster silvestrii* Grandi (1916: 253—264, figs. xli-xliv), *Crossogaster atrata* Masi (1917: 125—126, fig. 3), *Crossogaster odorans* Wiebes, spec. nov., described below, *Phagoblastus barbarus* Grandi (1955: 102—106, figs. viii-ix), the male described below, and *Phagoblastus liodontus* Wiebes (1979b: 397—400, figs. 20—37).

It appears that there are three species groups, as follows: *Crossogaster* s. str., species *C. triformis* and *odorans*. — Epistomal margin entire; antenna with one anellus; labial palpus consisting of one segment, the maxillary one- or indistinctly two-segmented¹⁾; female fore tibia with a dorso-apical, bidentate hook; stigma of the eighth urotergite especially in the female large, ovoid.

Phagoblastus, species *P. barbarus* and *liodontus*. — Epistomal margin entire; antenna with two anelli; labial palpus consisting of two segments, the maxillary of three; female fore tibia with a row of teeth.

Crossogaster, group of *C. silvestrii* and *atrata*. — Epistomal margin cleft in the middle; antenna with two anelli; labial palpus of *silvestrii* consisting of one segment, maxillary of two (*atrata*: 2, 3); female fore tibia with a row of conical spines.

Table 2. Host relations of *Crossogaster* and *Phagoblastus*.

<i>Ficus</i>	<i>Crossogaster</i>	<i>Phagoblastus</i>	<i>Elisabethiella</i>	<i>Allotriozone</i>	references
<i>vasta</i>	<i>triformis</i> ¹⁾		<i>socotrensis</i>		Wiebes, 1977b: 210
<i>burkei</i>	<i>odorans</i>	<i>barbarus</i>	<i>stuckenbergi</i>		present paper
<i>petersii</i>		<i>barbarus</i>	<i>stuckenbergi</i>		Grandi, 1955: 106
<i>leprieuri</i>		<i>liodontus</i>			Wiebes, 1979b: 397
<i>reflexa</i>		spec. ²⁾	<i>reflexa</i>		Wiebes, 1975: 234
<i>vogelii</i>	<i>silvestrii</i> ³⁾	spec. ⁴⁾		<i>heterandromorphum</i>	Grandi, 1916: 264
<i>baroni</i>	spec. ⁵⁾			<i>heterandromorphum</i>	Wiebes, 1974c: 140
<i>nautarum</i>	cf. <i>atratus</i>			<i>heterandromorphum</i>	Wiebes, 1975: 233

¹⁾ 8 ♀, Ethiopia, leg. Friis no. 2263 (RMNH, Leiden, no. 2905).

²⁾ *Crossogaster* spec, Wiebes, 1975.

³⁾ Host record inferred from the locality data.

⁴⁾ Newton & Lomo, 1979; the identity has to be checked.

⁵⁾ Series ♀ ♂, Madagascar, leg. L. Blommers (RMNH, Leiden, no. 2363).

Crossogaster s. str. and *Phagoblastus* are associated with Agaonidae of the genus *Elisabethiella*, as is apparent from the records listed in table 2. It should be noted that also *Philocaenus* Grandi may be found in *Elisabethiella*-figs. The two aberrant species of *Crossogaster* seem to be associated with Agaonidae of the genus *Allotriozone* Grandi. The species may be distinguished by the following key.

Key to the species of *Crossogaster* and *Phagoblastus*

1. Epistomal margin cleft in the middle 2
- Epistomal margin entire 3
2. Labial palpus consisting of two segments, the maxillary of three. Male unknown. Seychelles and Aldabra, ex *Ficus nautarum* Bak *atrata*
- Labial palpus consisting of one segment, the maxillary of two. Senegal, ex *Ficus vogelii* Miq *silvestrii*

¹⁾ Grandi (1928: 204, fig. xlii, 3) corrected Mayr (1885: 189) and stated that the maxillary palpus has two segments. In my material, from *Ficus vasta* Forsk. as well as from *F. burkei*, the basal segment of the maxillary palpus is short, in some instances merely consisting of a sclerotization of the connective membrane.

3. Antenna with one anellus. Female fore tibia with a dorso-apical, bidentate hook 4
- Antenna with two anelli. Female fore tibia with a comb of three to seven conical teeth 5
4. Female: antenna with sensilla linearia. Male: the hind tibia without very stout spines. Socotra, ex *Ficus vasta* Forsk *triformis*
- Female: antenna with long sensilla chaetica. Male: hind tibia rather heavily armed with dorsal and ventral rows of spines. Rhodesia and Zambia, ex *Ficus burkei* *odorans*
5. Female: mandible smooth, without teeth except at the apex. Male: the compound eye more than twice as long as the cheek (12 : 5). Gabon, ex *Ficus lepieuri* Miq. *liodontus*
- Female: mandible with a row of ventral teeth. Male: the compound eye not quite twice as long as the cheek. South Africa, Rhodesia and Zambia, ex *Ficus burkei* and *petersii* *barbarus*

***Crossogaster odorans* Wiebes, spec. nov.**

(figs. 16—24, 29—36; pl. 1 figs. 2, 4)

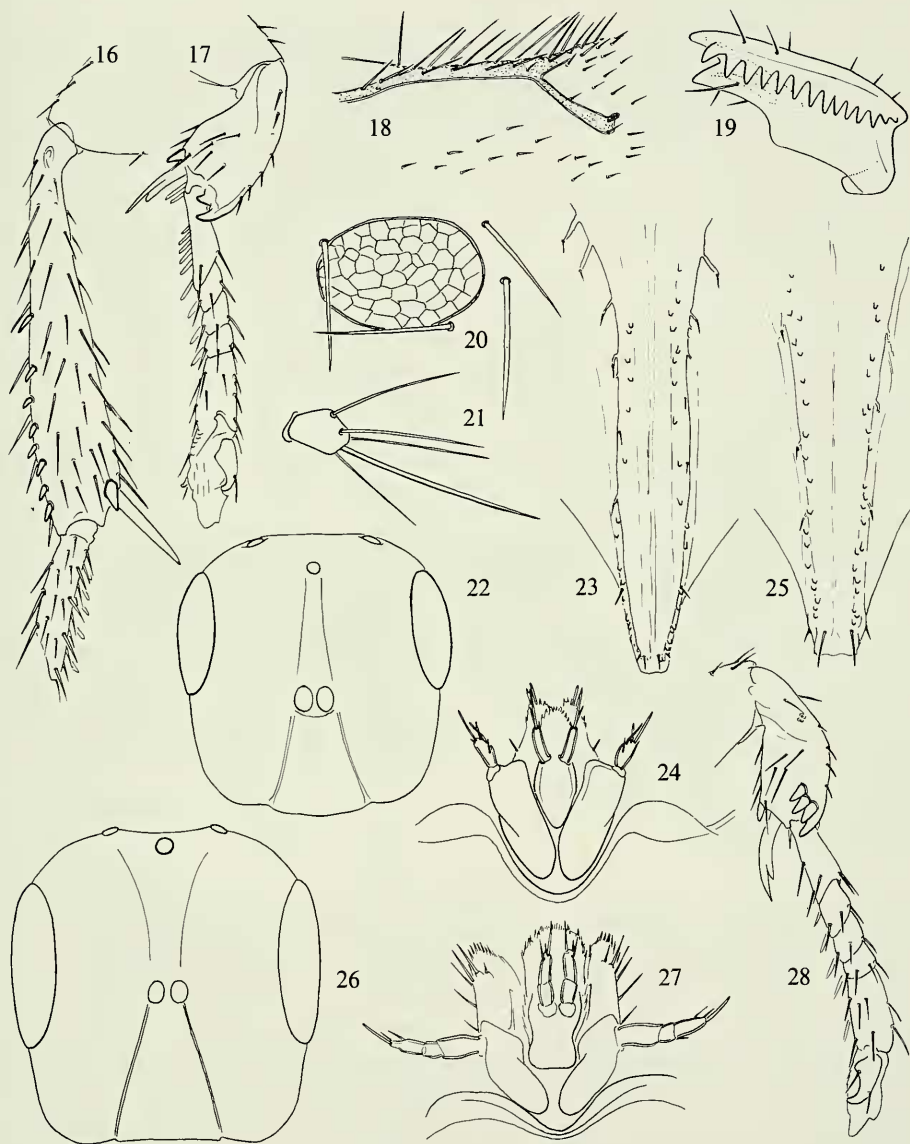
Female. — Length of the head, thorax and gaster 1.3—1.6 mm, the ovipositor valves ca. 0.15 mm long. Colour dark, especially the head and thorax, the gaster and the greater part of the legs lighter.

Head (fig. 22) about as long as wide across the compound eyes; the eye almost half as long as the head (5 : 11), slightly longer than the cheek (5 : 4). Three ocelli. The face has a triangular median impression, with the antennal toruli about half way between the epistomal margin and the median ocellus. Epistomal margin weakly convex. Antennal toruli close together. Mandible (fig. 19) with two apical teeth, two glands, and with a longitudinal row of approximately fourteen small teeth at the ventral surface. Labium and maxillae (fig. 24): the palpi unisegmented. Antenna (fig. 29) eleven-segmented, formula 1115(3); the scape five times as long as wide, 2½ times as long as the pedicel; the funicular segments and the club have long rod-like sensilla in an irregular row of about ten per segment (in some instances the sensilla are somewhat longer than drawn in the figure).

Thorax glabrous except for some long setae on the pronotum (which is wider than long, 5 : 4), the scutum (with complete parapsidal furrows) and the scutellum; and with a row of short setae on the mesosternum running from slightly behind the wing-basis almost to the coxal cavity of the mid leg¹). Fore leg (fig. 17): the tibia has long setae, the armature consists of a dorso-apical bidentate hook, one ventral cone, and a bifid spur, next to two peg-like spines at the axial apex; the tarsal segments approximately in ratio 7 : 2 : 2 : 2 : 6, with peg-like spines at the axial surface. Mid leg: tarsal ratio 12 : 7 : 6 : 5 : 6. Hind leg (fig. 16): the tibia heavily armed with setae and about eight conical spines

¹) I mentioned such a patch of setae for *Phagoblastus liodontus* Wiebes (1979b: 397, 399); it may be adaptive to (topocentric) pollination.

along the dorsal margin, one robust cone and a long spur-like spine in the ventral angle; the tarsal segments approximately in ratio 12 : 8 : 7 : 6 : 7, with many ventral and axial spines. Fore wing (7 : 3) 1.1 mm long, the submarginal, marginal, stigmal and postmarginal veins approximately in ratio 16 : 7 : 4 : 2



Figs. 16—24. *Crossogaster odorans* Wiebes, spec. nov., female holotype. 16, hind tibia and metatarsus; 17, fore tibia and tarsus; 18, venation of fore wing, detail; 19, mandible, ventral aspect; 20, stigma of eighth urotergite; 21, pygostyle; 22, head; 23, hypopygium; 24, mouthparts. Figs. 25—28. *Phagoblastus barbarus* Grandi, female. 25, hypopygium; 26, head; 27, mouthparts; 28, fore tibia and tarsus.

(fig. 18), the membrane glabrous in the proximal third, with small microtrichia distally; hind wing (4 : 1) 0.9 mm long.

Gaster. The posterior edges of the segments crenulate. Hypopygium (fig. 23) with short setae and small warts along the arms of the V, the spine short. Stigma (fig. 20) of the eighth urotergite large, ovoid in outline; the pygostyle (fig. 21) with five long setae.

Male. — Length of the head, thorax and gaster, ca. 1.5 mm. Colour yellowish, the long setae on the head, thorax and gaster blackish.

Head (fig. 31) about as long as wide across the compound eyes; the eye almost half as long as the head (5 : 11), distinctly longer than the cheek (5 : 3). Three ocelli. The antennal toruli situated just below an imaginary line connecting the lower rims of the eyes. Clypeus slightly impressed, the epistomal margin weakly convex. Mandible (fig. 36) with two teeth, the subapical of which situated on the outer side; two glands. Maxillary palpi two-segmented (1 : 5), labial palpi consisting of one segment, which is as long as the apical one of the maxillary palpi. Antenna (fig. 30) eleven-segmented, formula 1115(3); the scape five times as long as wide, more than twice as long as the pedicel (21 : 9); the club (segments in ratio 2 : 3 : 4) much wider than the funicle.

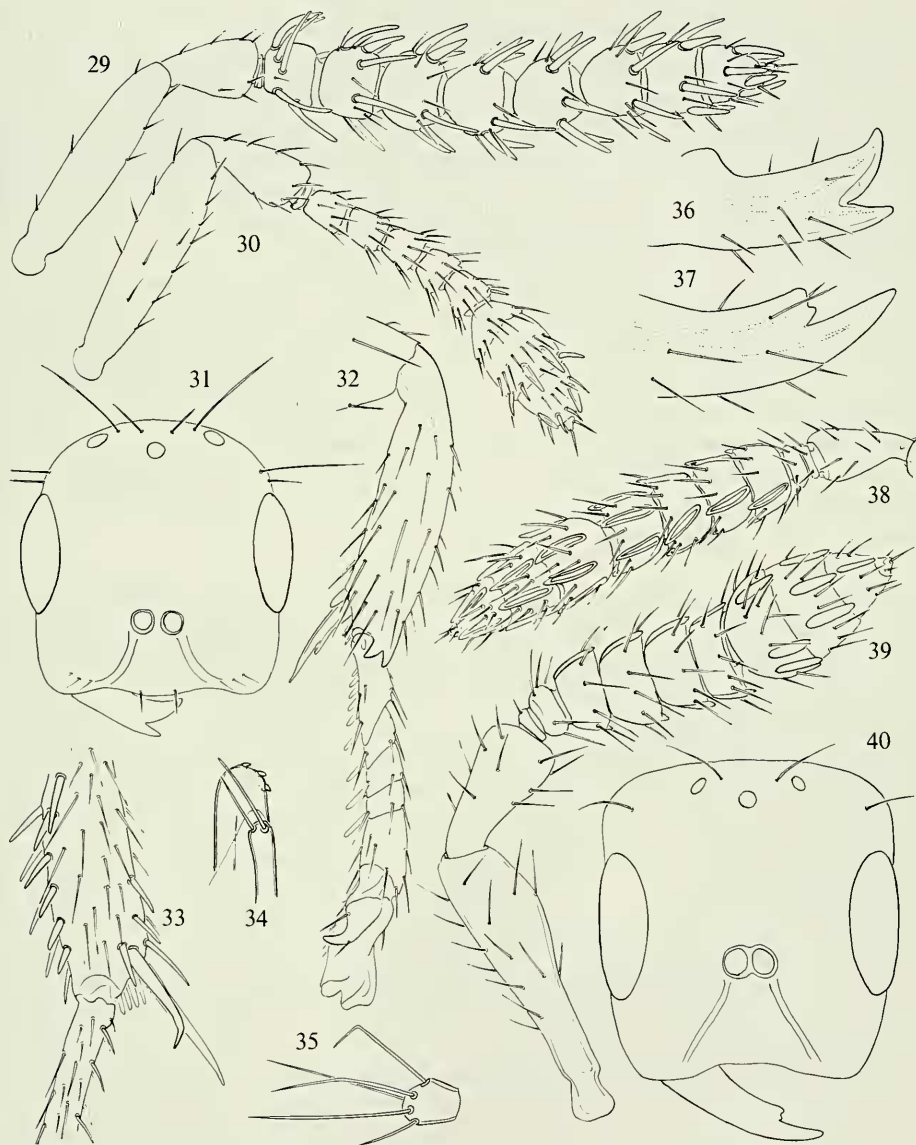
Thorax with a rather long pronotum (length: width, 3 : 5) and short mesoscutum (5 : 12), with short parapsidal furrows; the scutellum distinctly transverse (8 : 5), the propodeum wide (1 : 3). Fore leg (fig. 32): the tibia with two short dorso-apical teeth, one ventral conical spine and one bifid spur; axially, there are some slender spines next to the spur; the tarsal segments approximately in ratio 4 : 1 : 1 : 1 : 2, with peg-like spines on the axial surface. Mid leg: tarsal ratio 12 : 7 : 6 : 5 : 8. Hind leg (fig. 33): the tibia rather heavily armed with dorsal and ventral rows of spines and with two long ventral spurs; the tarsal segments approximately in ratio 15 : 9 : 7 : 5 : 9, with many setae and spines. Wings much as in the female, the submarginal, marginal, stigmal and postmarginal veins of the fore wing (12 : 5, 1.2 mm long) approximately in ratio 16 : 6 : 5 : 2; the hind wing (5 : 1) 0.9 mm long.

Gaster. The pygostyle (fig. 35) with five setae; the claspers of the genitalia (fig. 34) with three claws.

Type material. — Holotype ♀ (slide-mounted), Zimbabwe-Rhodesia: Salisbury, ex *Ficus burkei*, ii.1977 (A. Watsham); deposited in RMNH, Leiden (no. 2970). Paratypes: series ♀ ♂ and two mating pairs, same data as holotype (coll. dates ii-iv. 1977); Chishawasha nr. Salisbury, 15 ♀ 10♂, vii, xi.1974, i, iv, vi.1975, vii.1976, i.1977; Makumbi Mission, Chinamora Reserve, ex *Ficus burkei*, xii.1976 (A. Watsham). Zambia: Kafue National Park, Ngoma, ex *Ficus burkei*, 6♀, 8.xii.1977 (M. G. Bingham no. 2465); Chipata Golf Course, ex *Ficus burkei*, 1 ♂, 11.i.1979 (M. G. Bingham, no 2474). The material is deposited in the RMNH, Leiden, some duplicates are in the BMNH, London and in the Watsham Collection.

Comments. — Compared with *Crossogaster triformis* Mayr, the new species

can at once be distinguished by the sensilla of the female antenna. The male of *C. triformis* was not fully described and for that reason cannot be compared with the present sample.



Figs. 29—36. *Crossogaster odorans* Wiebes, spec. nov., female holotype (29) and male (30—36). 29, female antenna, axial aspect; 30, male antenna, axial aspect; 31, head; 32, fore tibia and tarsus; 33, apex of hind tibia, and metatarsus; 34, armature of genitalia; 35, pygostyle; 36, apex of mandible. Figs. 37—40. *Phagoblastus barbarus* Grandi, female (38) and male (37, 39, 40). 37, apex of mandible; 38, female antenna, antiaxial aspect; 39, male antenna, axial aspect; 40, head.

Phagoblastus barbarus Grandi

(figs. 25—28, 37—40)

Phagoblastus barbarus Grandi, 1955: 102—106. Holotype ♀, South Africa: Grahamstown (LEB) [examined].

Female. — Length of the head, thorax and gaster ca. 1.8 mm, the ovipositor valves ca. 0.2 mm long. Colour much as in *Crossogaster odorans*.

Head (fig. 26) variable, its length equal to its width in large specimens, up to distinctly larger than the width (11 : 10) in more slender examples; the eye more than half as long as the head (13 : 25), almost twice as long as the cheek (13 : 7). Mandible much as in fig. 19; the two segments of the labial palpus approximately in ratio 3 : 4, the three of the maxillary palpus 5 : 2 : 4 (fig. 27). Antenna (fig. 38), formula 1125(3): the scape six times as long as wide, 2½ times as long as the pedicel; the funicular segments with few linear sensilla.

Thorax, differential characters with *Crossogaster odorans*: fore tibia (fig. 28) with four or five teeth in the dorsal comb (seven in Grandi's specimens), the tarsal segments approximately in ratio 6 : 3 : 2 : 2 : 6. Mid leg: tarsal ratio 4 : 3 : 3 : 2 : 3. Hind tibia with a row of five or six conical spines along the dorsal margin and one conical spine next to the long spur at the ventral apex, much as in *Crossogaster odorans* (fig. 16); the tarsal ratio approximately 8 : 7 : 5 : 5 : 6.

Gaster. Hypopygium (fig. 25) with a short, rather wide spine. Stigma of the eighth urotergite approximately one-third of that of *Crossogaster odorans*; the pygostyle with four long setae.

Male. — The male was not known to Grandi; it is here compared to that of *Crossogaster odorans*, described above. Length of the head, thorax and gaster ca. 1.7 mm; the colour darker than in *Crossogaster odorans*. Head (fig. 40) as long as wide across the compound eyes, which are not quite half as long as the head (11 : 24) and much longer than the cheek (5 : 3). The antennal toruli are situated above an imaginary line connecting the lower rims of the eyes; the epistomal margin is almost straight. Mandible (fig. 37): the subapical tooth truncate at the tip or even bicuspidate, situated on the inner side of the large apical tooth; two glands. Maxillary palpus three-segmented (7 : 3 : 6), labial palpus two-segmented (9 : 11). Antenna (fig. 39), formula 1125(3); the scape slightly expanded distad, the anelli unequal (2 : 5), the funicular segments transverse, with lateral sensilla, the club wider, with more sensilla.

Thorax. The armature of the legs similar to that in *Crossogaster odorans*, the tarsal ratios as follows: fore leg, 3 : 1 : 1 : 1 : 3; mid leg, 10 : 7 : 6 : 4 : 8; hind leg, 13 : 9 : 7 : 5 : 9.

Gaster. Claspers of the genitalia with four or five claws.

Material. — Series ♀♂, Zimbabwe-Rhodesia: Makumbi Mission, Chinamora Reserve, ex *Ficus burkei*, xii.1976 (A. Watsham); Salisbury, ex *Ficus burkei*, series ♀♂, ii.1977 (A. Watsham). Zambia: Chipata, ex *Ficus petersii*, 6 ♀ 2 ♂, 11.i.1979 (M. G. Bingham, no. 2475). The material is deposited in the RMNH, Leiden, some duplicates are in the BMNH, London and in the Watsham Collection.

Comments. — Although the two specimens from Grandi's original series differ from the present specimens in the number of teeth on the fore tibia (seven versus four or five), I could not find any other characters warranting a specific distinction from *Phagoblastus barbarus*.

PHILOTRYPESINI

The Philotrypesini form a group of fig wasps immediately recognized by the tubularly lengthened eighth and ninth urotergites of the female and by the deeply emarginate hypostomal edge of the male. There are some twenty known species of *Philotrypesis* Förster (revised by Grandi, 1930), and one of *Philotrypomorpha* Abdurahiman & Joseph (1976) from India. In general, the differences between the species are rather slight, especially in the female sex, while in the male sex the polymorphism may make differentiation and identification difficult. *Philotrypesis* appears to be associated with species of all sections of *Ficus*. There are five species of *Philotrypesis* known from Africa. The present species cannot be confused with two of those because they have the sensilla of the female antenna situated in several rows per segment (*P. africana* Grandi, *longicornis* Grandi). From the other three viz., *P. erythraea* Grandi, *finitimorum* Wiebes and *selenetica* Grandi, it can be distinguished by the characters used in the following key.

Key to some African species of *Philotrypesis*

1. Female: setae on the antennal funicle dispersed over the segment. Male: hind basitarsus 3—4 times as long as the second segment 2
- Female: setae on the antennal funicle situated at the base of the segment. Male: hind basitarsus not quite twice as long as the second segment 3
2. Female: funicular segments of the antenna relatively short, e.g., the first only slightly longer than wide. Hind tibia with four conical spines in the dorso-apical corner. Male unknown. Guinea, ex *Ficus vogelii* Miq. *selenetica*
- Female: funicular segments of the antenna longer, e.g., the first 1½ times as long as wide. Hind tibia with two conical spines in the dorso-apical corner. Sierra Leone, ex *Ficus* cf. *eriobotryoides* K. & B. *finitimorum*
3. Female: the stigmal vein half as long as the postmarginal. Male: fore tibia with two stout spines proximad of the ventral spur; mid tibia with conical spines along the dorsal margin; hind femur without apical spines, the tibia without stout spines at one-third of its length. Eritrea, ex *Ficus* spec. ... *erythraea*
- Female: the stigmal vein one-third of the length of the postmarginal. Male: fore tibia with three stout spines proximad of the ventral spur; mid tibia without a row of dorsal conical spines; hind femur with two spines at the dorsal apex, the tibia with two stout spines at one-third of its length (fig. 47). Rhodesia and Zambia, ex *Ficus burkei* *parca*

***Philotrypesis parca* Wiebes, spec. nov.**

(figs. 41—57; pl. 2 figs. 1, 2, pl. 3 fig. 1)

Female. — Length of head, thorax and apparent gaster 1.8 mm, the tubular segments and the ovipositor valves ca. 3 mm. Colour yellowish, with black marks on the scutellum and propodeum, and on the dorsum of the gastral tergites.

Head (fig. 42) distinctly shorter than wide across the compound eyes (3 : 4); the compound eye almost two-thirds of the length of the head, $1\frac{1}{2}$ times as long as the cheek. Mandible (fig. 44) with two apical teeth, one of which is truncate; two glands; the labial palpus consisting of two segments (2 : 3), the maxillary (fig. 48) of four (4 : 6 : 3 : 11). Antenna (fig. 41) consisting of thirteen segments, formula 1135(3); the scape is three times as long as the pedicel; the funicular segments about as long as wide, each has one rather regular row of long sensilla and long, basal setae.

Thorax. The tibial armature of the fore leg (figs. 45, 46) consists of three conical antiaxial spines, viz., one ventral and two dorsals, and two slender axial spines next to the ventral spur; the tarsal segments are approximately in ratio 6 : 3 : 3 : 2 : 6. Mid leg: tarsal ratio 8 : 4 : 3 : 2 : 3. Hind leg: the tibial armature (fig. 47) consists of two unequal ventral spurs accompanied by two slender antiaxial spines and a row of axials, and four to six spines at the antiaxial dorsal apex; the tarsal segments are approximately in ratio 11 : 7 : 4 : 3 : 4. Fore wing (5 : 2) 1.3 mm long, the submarginal, marginal, stigmal and postmarginal veins approximately in ratio 6 : 4 : 1 : 3; the hind wing (4 : 1) 0.8 mm long.

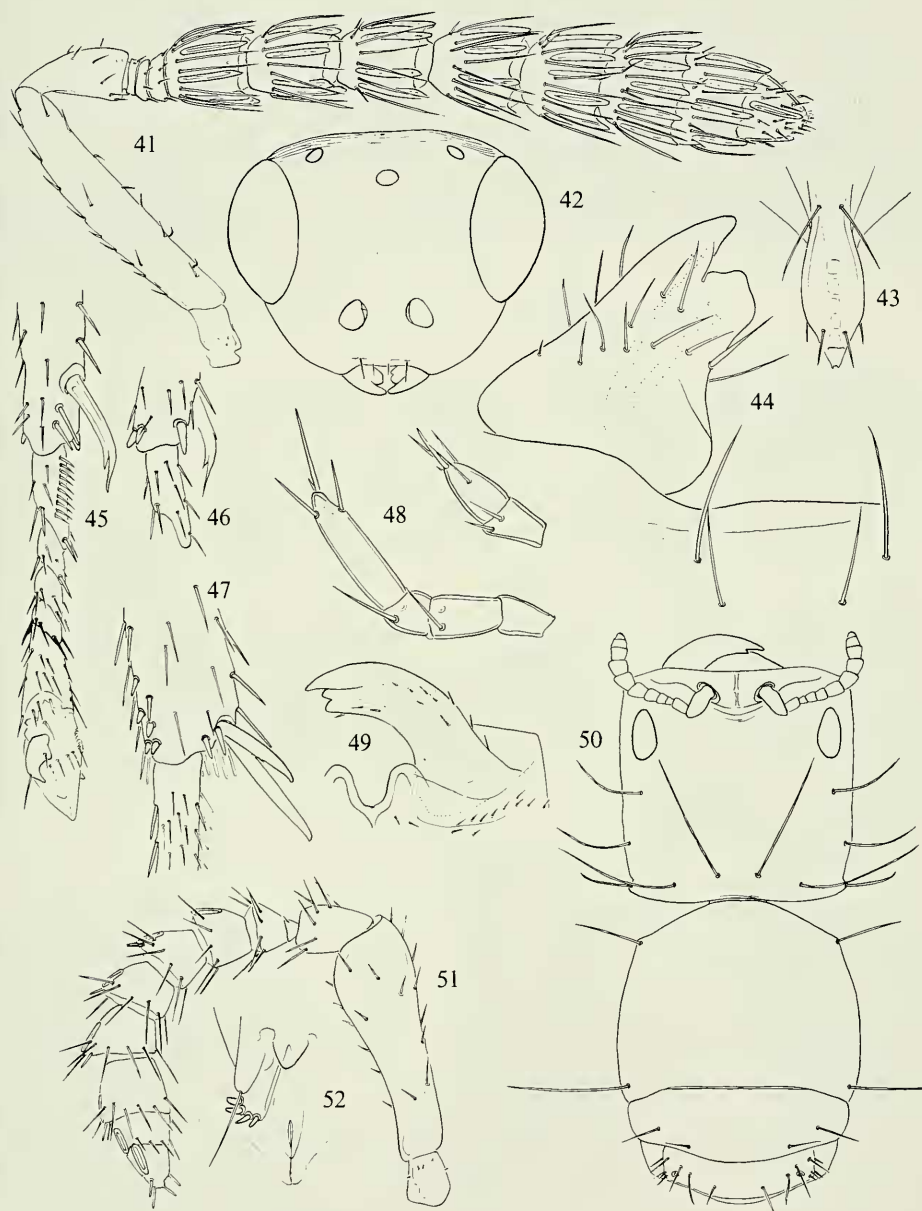
Gaster. The hypopygium (fig. 43) has a short, wide spine. The eighth urotergite is only slightly shorter than the combined lengths of the proximal segments (20 : 23), the ninth is not quite half as long as the eighth (9 : 20). The ovipositor and the valves are distinctly more than twice as long as the eighth and ninth urotergites combined (22 : 9).

Male. — Length of head and thorax 0.8—0.9 mm. Colour yellowish. All specimens studied are eumegetic, acanthocephalous, macrognathous (tridontous) and apterous.

Head (fig. 50) about as long as wide across the compound eyes; the compound eye over one-fifth of the length of the head (2 : 9), longer than the cheek (5 : 3). The head bears long dorsal setae, but no ventrals. The antennal toruli are situated in a shallow depression above the epistomal edge. Mandible falcate, with two glands (fig. 49, also showing the hypostomal edge, so characteristic for all species of *Philotrypesis*), the labial palpus consisting of two segments (11 : 10), the maxillary of four (2 : 2 : 1 : 3). Antenna (fig. 51) eleven-segmented, formula 1115(3); the scape is less than five times as long as the pedicel (23 : 5); the five funicular segments are gradually widening distad, the second to fourth have apical sensilla.

Thorax with the pronotum much longer than the other segments combined (5 : 3), with long setae in the anterior and posterior corners; the mesonotum is (in the middle) more than twice as long as the metanotum and the propodeum taken together. Fore leg: the tibial armature (figs. 53, 56) consists of three stout axial spines, proximad of the ventral spur and one antiaxial, one robust spine at

the axial and antiaxial apices, and one in the dorso-apical angle accompanied by four conical spines; the tarsal segments are approximately in ratio



Figs. 41—52. *Philotrypesis parca* Wiebes, spec. nov., female (41—48) and male holotype (49—52). 41, female antenna, axial aspect; 42, head; 43, apex of hypopygium; 44, clypeus and left mandible, dorsal aspect; 45, apex of fore tibia, and tarsus, axial aspect; 46, do., detail in antiaxial view; 47, apex of hind tibia; 48, mouthparts, palpi; 49, hypostomal margin and right mandible, ventral aspect; 50, head and thorax; 51, male antenna, axial aspect; 52, genitalia.



Figs. 53—57. *Philotrypesis parca* Wiebes, spec. nov., male holotype. 53, apex of fore tibia, and tarsus, axial aspect; 54, apex of mid tibia, and tarsus; 55, hind tibia, axial aspect; 56, apex of fore tibia, and part of tarsus, antiaxial aspect; 57, apex of hind tibia, and tarsus (long setae not fully drawn). Figs. 58—60. *Sycoscapter cornutus* Wiebes, spec. nov., male holotype. 58, fore tibia and tarsus; 59, mid tibia, and part of tarsus; 60, apex of hind tibia, and tarsus.

3 : 1 : 1 : 1 : 15. Mid leg: the tibia (fig. 54) has a small dorsal cone and two more slender ventral spines at the apex (one axial and one antiaxial), the ventral margin has six large spines, the dorsal margin is without the row of conical spines described and figured for all forms of *P. erythraea*; the tarsal segments are approximately in ratio 11 : 4 : 5 : 4 : 24. Hind leg (figs. 55, 57): the femur have two spines, one behind the other, at the dorsal apex; the tibial armature consists of two spines (situated just beyond one-third of the length of the tibia) that are not apparent in *P. erythraea*; some more spines, most of which small and conical, occur along the dorsal margin and at the antiaxial apex; two longer, slender spines accompany the unequal ventral spurs, and three larger spines are situated along the distal third of the ventral margin; the tarsal segments (measured along the dorsal margin) approximately in ratio 8 : 5 : 1 : 1 : 7, the proximal two expanded dorsad, with long setae.

Gaster. The claspers of the genitalia (fig. 52) with four claws.

Type material. — Holotype ♀ (slide-mounted) Zimbabwe-Rhodesia: Salisbury, ex *Ficus burkei*, ii.1977 (A. Watsham); deposited in RMNH, Leiden (no. 2964). Paratypes: series ♀ 5 ♂, same data as holotype; Chishawasha nr. Salisbury, 5 ♀ 5 ♂, 1976, vi.1977. Zambia: Chipata Golf Course, ex *Ficus burkei*, 3 ♀ 4 ♂, 11.i.1979 (M. G. Bingham, no. 2474). The material is deposited in the RMNH, Leiden, some duplicates are in the BMNH, London and in the Watsham Collection.

Comments. — The present material differs only slightly from Grandi's *Philotrypesis erythraea*, just enough — although originally with some doubt — to consider them separate taxa. A similar situation exists with *Elisabethiella stuckenbergi* and *socotrensis* (discussed above) and *Otitesella tsamvi* and *epicarioides* (compared below). For the alate male (?), see below, under *Watshamiella alata*.

SYCORYCTINI

A key to the Indo-Australian genera of this group was published by Wiebes (1966c: 173). Revisionary notes on some were given by Wiebes (1967: 428, *Sycoscapteridea* Ashmead; 1978b: 185—186, *Sycoscapter* Saunders in Westwood). Abdurahiman & Joseph (1975a: 99) added a new genus *Sycorycteridea*, which they compared with *Sycoryctes* Mayr. As a group, the Sycoryctini are recognizable in the female sex by the tubularly lengthened ninth urotergite, which makes the impression that the apparent gaster ends with the eighth segment; the males are mostly apterous, subapterous in some species and, as will be apparent from one of the descriptions below, alate in others. The apterous males can be distinguished at a glance from those of *Philotrypesis* by the straight or almost straight hypostomal edge.

As many samples of fig insects bred from one fig contain several species and genera of Sycoryctini (up to four were recorded by Wiebes, 1966), it is not always easy to correlate the sexes. For the present study mating pairs were available of all species, so as to allow of a certain correlation of males with their females. In

general, the generic classification of the Sycoryctini is still unsatisfactory and this is why I here confine myself to the differentiation of the genera treated in the general key (p. 159).

Sycoscapter Saunders in Westwood

A survey of the species now recognized in the genus *Sycoscapter* was given with a recent redescription of its type-species (Wiebes, 1978): the African species are *S. gibbus* Saunders and *S. montis* Wiebes. The new species now added may be differentiated from its African congeners by the following key. The male sexes are recognizable as a group by the ventral spur of the fore tibia being bifid, instead of simple as in the Indo-Malayan species.

Key to the African species of *Sycoscapter*

1. Female: the fore wing with about fifteen large setae in the marginal-stigmal angle, some ten along the stigmal vein and a few in the wing-apex; the ninth urotergite about six times as long as the apparent gaster. Male: all tarsi consisting of four segments; wing remnant present. Sierra Leone, ex *Ficus* cf. *eriobotryoides* K. & B. *montis*
- Female: the fore wing with thirty or more large setae in the marginal-stigmal angle, and 15—20 along the stigmal vein; the ninth urotergite two to three times as long as the apparent gaster. Male: all tarsi consisting of five segments; no wing remnant 2
2. Female: the fore wing with many setae in the apical part, so as to make the surface distinctly hirsute. Male: the epistomal margin almost straight or with two slightly protruding bulges. Madagascar, ex *Ficus soroceoides* Baker and Réunion, ex *Ficus laterifolia* Vahl *gibbus*
- Female: the fore wing with only a few large setae in the apical part, otherwise glabrous. Male: the epistomal margin distinctly produced into two rather acute lobes. Rhodesia and Zambia, ex *Ficus burkei* and *petersii* *cornutus*

Sycoscapter cornutus Wiebes, spec. nov.

(figs. 58—60, 64—66, 75—76, 83; pl. 2 fig. 3)

Female. — Length of head, thorax and apparent gaster ca. 1.4 mm, the ninth tergite (the “tail”) ca. 2 mm, i.e., $2\frac{1}{2}$ —3 times as long as the apparent gaster. Colour blackish bronze, the basal segments of the legs up to the tibiae brown, sometimes also the dorsal part of the tibiae dark, mostly the tibiae and tarsi yellow.

Head (fig. 65) shorter than wide across the compound eyes (9 : 11), the eye half as long as the head and as long as the cheek. Antennal toruli slightly below the middle of the face; deep scrobes run from the toruli to the median ocellus. Epistomal margin produced into an acute median projection. Mandible with two rather robust apical teeth; two glands; the labial palpus consisting of two segments (4 : 3), the maxillary of four (6 : 7 : 5 : 13). Antenna (fig. 66), formula 1125(3); the scape $2\frac{1}{2}$ times as long as the pedicel; the funicular

segments with one row of long sensilla, and with a basal row of long setae.

Thorax. Fore leg with two dorsal cones and one antiaxial spine on the tibial apex, and with a bifid ventral spur accompanied by a slender spine; the tarsal ratio approximately 5 : 3 : 2 : 2 : 6. Mid leg: tarsal ratio 9 : 5 : 4 : 3 : 5. Hind leg: the tibia with about six to nine small conical spines along the distal two-thirds of the dorsal margin, and one or two short spines in the ventral angle, next to the two spurs; the tarsal segments approximately in ratio 13 : 10 : 5 : 4 : 7. Fore wing (2 : 1) 1.2 mm long, the submarginal, marginal, stigmal and postmarginal veins approximately in ratio 5 : 4 : 3 : 6, the stigma (fig. 64) boot-shaped; ca. 35 long setae occur in the marginal-stigmal angle, some fifteen on or along the stigmal vein, and a few in the part distad of this vein; hind wing (4 : 1) 0.8 mm long.

Gaster. Hypopygium (fig. 83) with a short and wide spine, and one pair of long setae.

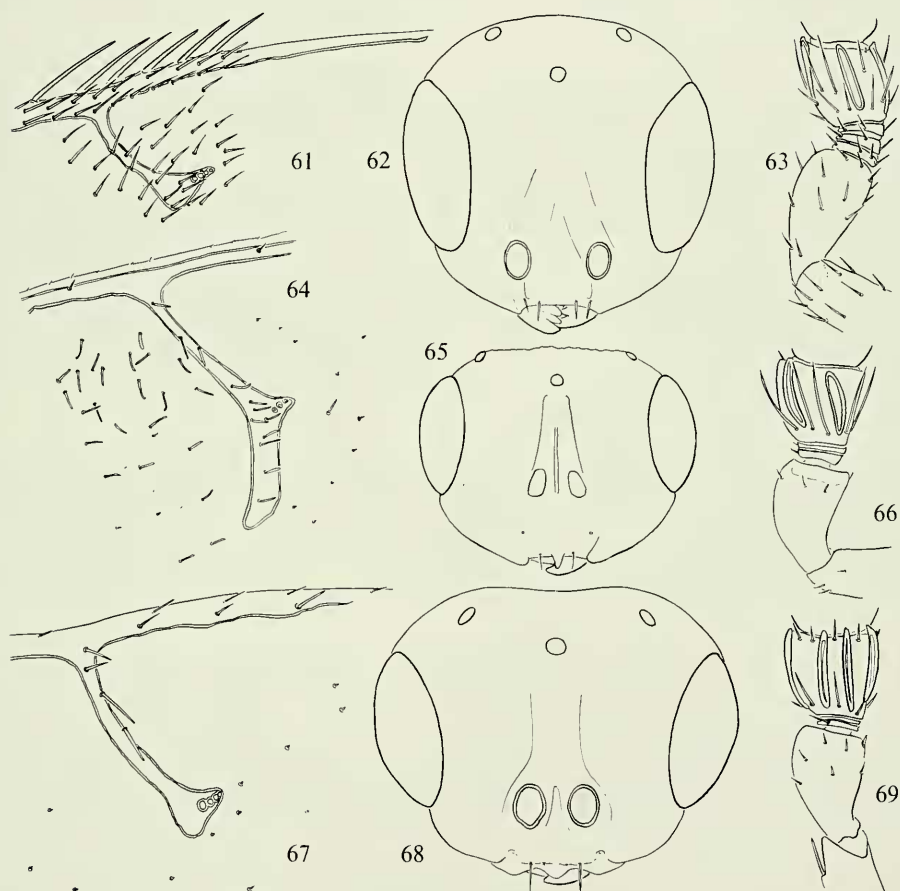


Fig. 61—69. Details of some female Sycoryctini: 61—63, *Watshamiella alata* Wiebes, gen. & spec. nov.; 64—66, *Sycoscapter cornutus* Wiebes, spec. nov.; 67—69, *Sycoryctes remus* Wiebes, spec. nov. 61, 64, 67, veins of fore wing; 62, 65, 68, head; 63, 66, 69, scape, anelli and first funicular segment of antenna.

Male. — Length of head and thorax ca. 1.0 mm. Colour and general habitus as in pl. 2 fig. 4, but the epistomal edge with more distinct horn-like projections (fig. 75) and the tarsal segments much shorter, especially those of the fore leg (fig. 58).

Head (fig. 75) longer than wide across the compound eyes (10 : 9); the compound eye one-quarter of the length of the head, about as long as the cheek. The toruli are close together at the epistomal margin, which bears two horn-like projections with a seta on top. Mandible robust, with a serrate molar edge and with two glands; the labial palpus consisting of two segments (2 : 1), the maxillary of four (5 : 6 : 2 : 4). Antenna (fig. 76) eleven-segmented, formula 1115(3); the first and third funicular segments larger than the others, with an apical sensillum (axial in the one, antiaxial in the other); the club segments unequal (3 : 1 : 1), with sensilla on the apical and subapical.

Thorax (fig. 75): the pronotum rather short, 1½ times as wide as long in flattened position, also much wider than the mesonotum (10 : 7) and the posterior tergite (10 : 9) representing the metanotum (the lateral lobes) and the propodeum. All legs bear relatively few tibial spines. The fore coxa has an antiaxial, hyaline edge; except for one long axial, all spines of the fore tibia are fully visible in antiaxial aspect (fig. 58); the ventral spur is rather long and bifid; the five tarsal segments are approximately in length ratio 5 : 1 : 1 : 1 : 17. The mid tibia (fig. 59) is more robust than those of the other *Sycoryctini* treated here; it bears pairs of ventral spines in the distal half, one simple spur that is as long as the first three tarsi combined, one apical on either side, and up to ten dorsals in the distal half; the tarsal ratio is 3 : 2 : 2 : 2 : 10. The hind tibia (fig. 60) has small spines along two-thirds of the dorsal margin and four longer spines near the ventral apex next to the spur, which is as long as the basitarsus; the tarsal ratio is 3 : 1 : 1 : 1 : 6.

Gaster: the claspers of the genitalia with three or four claws.

Type material. — Holotype ♂ (slide-mounted), Zimbabwe-Rhodesia: Salisbury, ex *Ficus burkei*, ii.1977 (A. Watsham); deposited in RMNH, Leiden (no. 2968). Paratypes: series ♀ ♂ and 13 mating pairs, same data as holotype (coll. dates iii-v.1977); Chishawasha nr. Salisbury, 22 ♀ 28 ♂, vii.1974, v.1975, 1976, i, vi.1977; Makumbi Mission, Chinamora Reserve, ex *Ficus burkei*, series ♀ 9 ♂, xii.1976 (A. Watsham). Zambia: Kafue National Park, Ngoma, ex *Ficus burkei*, 4 ♂, 8.xii.1977 (M. G. Bingham, no. 2465); Chipata Golf Course, ex *Ficus burkei*, 1 ♂, 11.i.1979 (M. G. Bingham, no. 2474); Chipata, ex *Ficus petersii*, 2 ♀, 11.i.1979 (M. G. Bingham, no. 2475); Lusaka, Cathedral of the Holy Cross, ex *Ficus burkei*, 19 ♀ series ♂, 16.ii.1979 (M. G. Bingham, no. 2490). The material is deposited in the RMNH, Leiden, some paratypes in BMNH, London and the Watsham Collection.

Sycoryctes Mayr

The type-species of *Sycoryctes*, *S. patellaris* Mayr, originates from Java. It seems that most Indo-Malayan species of the genus are distinct in having long setae on the male hind basitarsus (Mayr, 1885, pl. 13 fig. 30) instead of shorter

setae as in the African species (e.g., fig. 78). Many of the African species are insufficiently known; the new species described below are compared with the following: *S. caelebs* Wiebes, *coccothraustes* Mayr, *lomaensis* Wiebes, *sjoestedti* Mayr, *truncatus* Mayr. Two species are known in the female sex only, viz., *S. dagatiguyi* (Risbec), which has a longer postmarginal vein than the specimens from *Ficus burkei* (where the postmarginal is scarcely longer than the stigmal); and *S. sebertianus* Masi, which seems to be rather larger (6.6 mm versus 5 mm, including the "tail"). In general, the females are difficult to differentiate, as in most cases the descriptions are very short and mostly refer to colour characters. In the present paper, too, the females of the two new species are distinct mainly in colour. The males can be distinguished by the characters used in the following key. Much as the present novelties appear well characterized, the differentiation of some of the others is still unsatisfactory.

Key to the males of African *Sycoryctes*

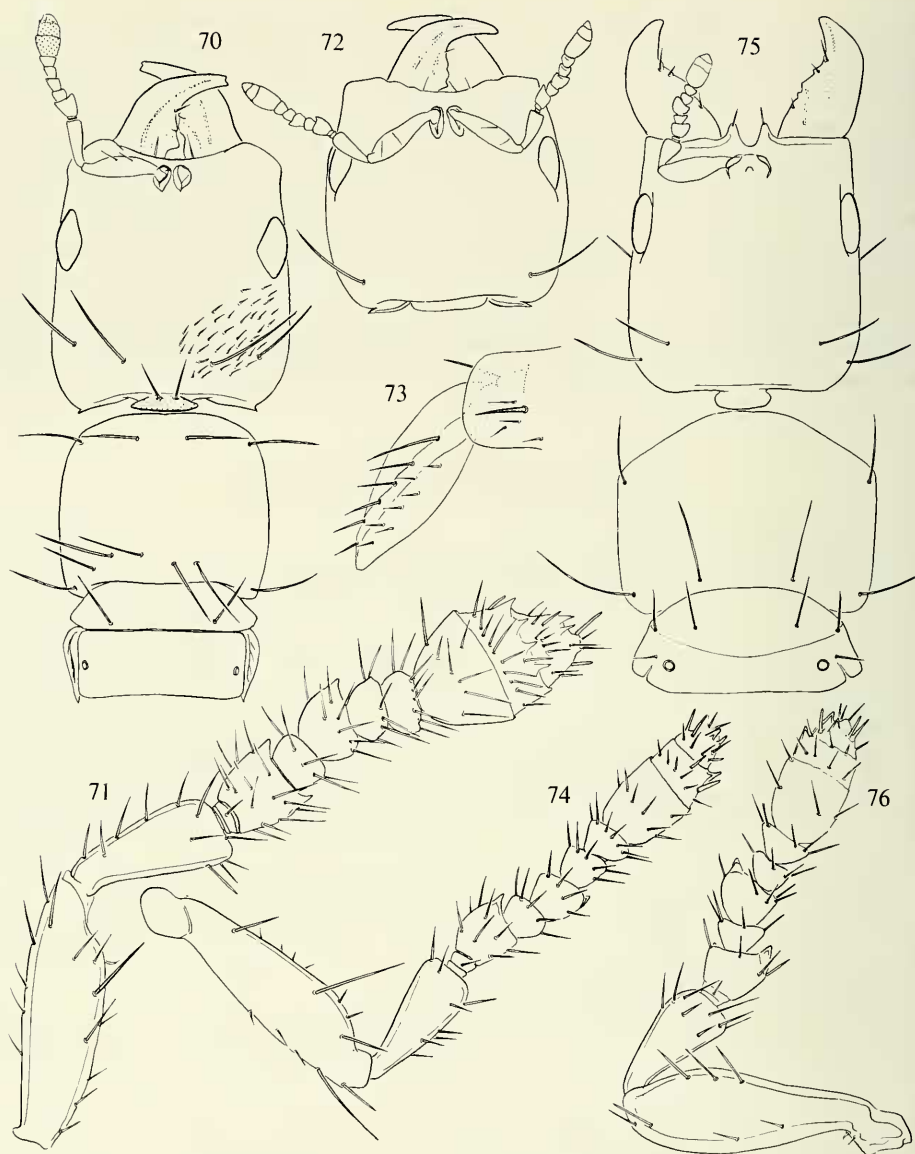
1. Head and thorax hirsute dorsally 2
- Head and thorax with some long setae; but not hirsute 3
2. Spur of the hind tibia as long as the basitarsus. Cameroons, ex *Ficus* spec. *sjoestedti*
- Spur of the hind tibia reaching to the third tarsal segment. Rhodesia, ex *Ficus burkei* *hirtus*
3. Spur of the hind tibia long, reaching up to the fourth or fifth segment 4
- Spur of the hind tibia much shorter, reaching to the third segment 5
4. Eye small, one-third of the cheek. Basitarsus of the hind leg not expanded. Socotra, ex *Ficus vasta* Vahl *coccothraustes*
- Eye almost as long as the cheek. Basitarsus of the hind leg in most instances distinctly expanded. Rhodesia and Zambia, ex *Ficus burkei* and *petersii*. . . *remus*
5. Head distinctly longer than wide (3 : 2), the lateral margins straight. Sierra Leone, ex *Ficus* cf. *eriobotryoides* K. & B. *lomaensis*
- Head transverse, the lateral margins curved 6
6. Antenna with one anellus. Socotra, ex *Ficus vasta* Vahl *truncatus*
- Antenna with two anelli. Aldabra, ex *Ficus avi-avi* Bl. *caelebs*

Sycoryctes remus Wiebes, spec. nov.

(figs. 67—69, 72—74, 77—79, 84; pl. 2 fig. 4)

Female. — Length of head, thorax and apparent gaster 1.3—1.6 mm, the ninth tergite ca. 2 mm, i.e., 2½ times as long as the apparent gaster. Blackish, also the legs up to and including the tibiae dark; the wings hyaline.

Head (fig. 68) distinctly shorter than wide across the compound eyes (23 : 28), the eye more than half as long as the head (12 : 23) and about twice as long as the cheek. Antennal toruli situated in the lower third of the face, at a distance from the epistomal margin equal to their longitudinal diameter; shallow scrobes run to the median ocellus. Epistomal margin with three wide lobes. Mandible bidentate; two glands; the labial palpus consisting of two segments (4 : 5), the



Figs. 70—71. *Sycoryctes hirtus* Wiebes, spec. nov., male holotype. 70, head and thorax; 71, antenna, axial aspect. Figs. 72—74. *Sycoryctes remus* Wiebes, spec. nov., male holotype. 72, head; 73, lateral lobe of mesothorax, and wing remnant; 74, antenna, axial aspect. Figs. 75—76. *Sycoscapter cornutus* Wiebes, spec. nov., male holotype. 75, head and thorax; 76, antenna, axial aspect.

maxillary of four (2 : 4 : 1 : 5). Antenna (fig. 69), formula 1125(3); the scape three times as long as the pedicel; the funicular segments with one row of long sensilla, and with long basal and shorter apical setae.

Thorax. Fore leg: the tibial armature consisting of two dorso-apical spines and one subapical; ventrally, there is the bifid spur and some accompanying spines, viz., one distal of the spur and two, more slender, proximad; the tarsal segments

approximately in ratio 16 : 8 : 8 : 5 : 12. Mid leg: tarsal ratio 19 : 9 : 6 : 4 : 7. The tibial armature of the hind leg consisting of two unequal spurs and some stout spines along the distal half of the ventral margin: typical is a number of three dark spines and some lighter more proximally; the distal third of the dorsal margin has four or five conical spines and two apicals; the tarsal segments approximately in ratio 22 : 10 : 7 : 4 : 8. Fore wing (5 : 2) 1.25 mm long, the submarginal, marginal, stigmal and postmarginal veins approximately in ratio 35 : 18 : 9 : 11 (fig. 67), the wing hyaline but for some setae along the veins; hind wing (4 : 1) 0.9 mm long.

Gaster. Hypopygium (fig. 84) broadly rounded, with two setae of medium size at the apex; a patch of two or three setae occur on either side, where the arms of the V appear broken.

Male. — Length of head and thorax 0.7—0.9 mm. General habitus pl. 2 fig. 4; in most specimens, the basitarsus of the hind leg is more distinctly enlarged.

Head (fig. 72) quadrate or slightly transverse, more elongate in small specimens; almost similar in shape to that of *Sycosapter cornutus*, but the epistomal margin less distinctly cornute or even almost straight in the middle; the posterior edge of the head rather sharp, laterally produced into acute angles. Also mandible similar; the segments of the labial palpus approximately in ratio 3 : 2, those of the maxillary palpus 7 : 14 : 4 : 9. Antenna (fig. 74), formula 1125(3).

Thorax much as in *Sycosapter cornutus*, but with a distinct wing remnant (fig. 73). The fore leg (fig. 79) resembles that of *Sycoryctes hirtus*, to be described hereafter, but the dorsal and ventral spines are less in number and there are two apical spines instead of one; the tarsus is more compact, its ratio 5 : 3 : 2 : 2 : 6. The mid leg is long and slender; the tibia (fig. 77) has many spines along the dorsal and ventral edges and a long ventral spur reaching to the third tarsal segment; the tarsal ratio approximately 8 : 4 : 4 : 3 : 9. Hind leg (fig. 78) much like that of *S. hirtus*, but two ventral spines are sometimes situated on a small tibial protuberance, so as to make them very conspicuous, the tibial spur reaches to the fourth tarsal segment; the basitarsus distinctly expanded, the ratio 13 : 4 : 4 : 4 : 9.

Gaster: the claspers of the genitalia wide, with three to five claws.

Type material. — Holotype ♂ (slide-mounted). Zimbabwe-Rhodesia: Salisbury, ex *Ficus burkei*, ii.1977 (A. Watsham); deposited in the RMNH, Leiden (no. 3713). Paratypes: series ♀ ♂ and eight mating pairs, same data as holotype (coll. dates ii-v.1977); Chishawasha nr. Salisbury, 12 ♀ 10 ♂, 1976, vi.1977; Makumbi Mission, Chinamora Reserve, ex *Ficus burkei*, series ♀ 15 ♂, xii.1976 (A. Watsham). Zambia: Kafue National Park, Ngoma, ex *Ficus burkei*, 1 ♀ 7 ♂, 8.xii.1977 (M. G. Bingham, no. 2964); Chipata Golf Course, ex *Ficus burkei*, 5 ♀ 3 ♂, 11.i.1979 (M. G. Bingham, no. 2474); Chipata, ex *Ficus petersii*, 2 ♂, 11.ii.1979 (M. G. Bingham, no. 2475); Luapula Prov., Mumunshi Banana Estate, ex *Ficus* cf. *burkei*, 1 ♀, 9.xii.1978 (M. G. Bingham, no. 2471); Lusaka, Cathedral of the Holy Cross, ex *Ficus burkei*, 30 ♀ 24 ♂, 16.ii.1979 (M. G. Bingham, no. 2490). The material is deposited in the RMNH, Leiden, some paratypes are in the BMNH, London and in the Watsham Collection.

***Sycoryctes hirtus* Wiebes, spec. nov.**
(figs. 70, 71, 80, 81)

Female. — Length of head, thorax and apparent gaster ca. 1.5 mm, the ninth tergite ca. 2.5 mm long, i.e., three times as long as the apparent gaster. Blackish as in *S. remus*, but more dull, the legs from the femora onwards yellowish. In all morphological characters this species very much resembles *Sycoryctes remus*, but the number of ventral spines on the hind tibia tends to be larger (up to six) and there usually also are more dorsal spines (six to eight). In some of the samples I could not identify all female specimens with any certainty.

Male. — Length of head and thorax 0.9—1.0 mm. General habitus as in pl. 2 fig. 4, but the head and thorax hirsute dorsally, the antenna slender with a brownish apical knob, and the head with a cervical sclerite (fig. 70); the basitarsus of the hind leg is not expanded.

Head (fig. 70): shape and proportions much as in *Sycoscapter cornutus*, but the epistomal margin straight; the pubescence of the dorsal surface especially distinct in lateral aspect, as a short fur in between the longer setae — the same applies to the thorax. The posterior part of the head is raised in the middle, so as to form a small cervical shield; the lateral angles of the head are slightly produced. The molar teeth of the mandible stout; the segments of the labial palpus approximately in ratio 1 : 1, those of the maxillary palpus 7 : 10 : 3 : 5. Antenna (fig. 71), formula 1125(3).

Thorax, fig. 70. Compared to *Sycoscapter cornutus*, the fore tibia (fig. 80) more slender, with a series of five ventral spines proximad of the bifid spur, one apical spine visible in antiaxial aspect, and three dorsals in the apical third, inserted more axially; the tarsal ratio approximately 6 : 6 : 3 : 2 : 8. Hind tibia (fig. 81): long dorsal spines among a row of cones in the distal two-thirds; ventrally, there are three or four conspicuous spines in the distal third and one long spur, reaching to the third tarsal segment; the tarsal ratio approximately 8 : 3 : 3 : 2 : 5.

Gaster: the claspers of the genitalia with four claws.

Type material. — Holotype ♂ (slide-mounted), Zimbabwe-Rhodesia: Salisbury, ex *Ficus burkei*, ii.1977 (A. Watsham); deposited in RMNH, Leiden (no. 2967). Paratypes: 9 ♀ 7♂ and seven mating pairs, same data as holotype (coll. dates iii-iv.1977); Chishawasha nr. Salisbury, 10 ♀ 4 ♂, vii.1974, 1976, vi.1977; Makumbi Mission, Chinamora Reserve, ex *Ficus burkei*, 2 ♀ 3 ♂, xii.1976 (A. Watsham). Zambia: Lusaka, Cathedral of the Holy Cross, ex *Ficus burkei*, 9 ♀ 13 ♂, 16.ii.1979 (M. G. Bingham, no. 2490). The material is deposited in the RMNH, Leiden, some paratypes in the BMNH, London and in the Watsham Collection.

***Watshamiella* Wiebes, gen. nov.**

Type-species: *Watshamiella alata* Wiebes, spec. nov.

Sycoryctini with alate male. Toruli of the antennae widely spaced, situated



Figs. 77—79. *Sycoryctes remus* Wiebes, spec. nov., male holotype. 77, mid tibia and tarsus; 78, apex of hind tibia, and tarsus; 79, fore tibia and tarsus. Figs. 80—81. *Sycoryctes hirtus* Wiebes, spec. nov., male holotype. 80, for tibia and basitarsus; 81, apex of hind tibia, and two tarsal segments. Figs. 82—84. Female hypopygium of some *Sycoryctini*: 82, *Watshamiella alata* Wiebes, gen. & spec. nov.; 83, *Sycoscapter cornutus* Wiebes, spec. nov.; 84, *Sycoryctes remus* Wiebes, spec. nov.

rather close to the epistomal margin, which is straight. Mandible bidentate (most males) or tridentate (females). Antenna with three anelli. Pronotum long; parapsidal furrows complete or almost so. Front femur inflated. Hind basitarsus at least as long as the second and third segments combined. Wings hirsute; the postmarginal vein 2—3 times as long as the stigmal. Gaster shortly petiolate; the ninth urotergite of the female with lateral rows of setae, and with small pygo-style; also the male ninth urotergites with pygo-style.

Comments. — The correlation of the female of *W. alata* with an alate male made me reconsider the generic identification of such males, up to now classified with *Philotrypesis* Förster, viz., *P. anguliceps* (Westwood), *finitimorum* Wiebes and *longicornis* Grandi. The first mentioned appears to be congeneric with the one here treated and thus should be allocated to *Watshamiella*. *P. finitimorum* has short wing remnants and, for the time being, there is no reason to alter its generic status; the wings in *P. longicornis* are longer, but this male, which I did not study myself, is so similar to its female that I prefer to leave it in *Philotrypesis*.

Other species to be compared were up to now classified with *Sycoscapteridea* Ashmead, viz., the female identified with *S. monilifera* by Wiebes (1967) and *S. stilifera* Wiebes (1966). Both are now allocated to *Watshamiella*.

It should be clearly stated that in classifying *Watshamiella* with the Sycoryctini, much weight is given to the structure of the ovipositing organs (Wiebes, 1966a), while the resemblance to the Philotrypesini is neglected e.g., in the three antennal anelli, the situation and number of spines on the legs, the long postmarginal vein of the fore wing. The *Watshamiella*-males, known from their association with the females with which they were found in copula, are very similar to a type of male that I know from the Indo-Malayan region and of which we now also have at least one from *Ficus thonningii*. AW pictured it (pl. III fig. 1), but JTW could not yet study it in any detail: it has a bare strip along the marginal vein, just as *Philotrypesis*-females usually have. Probably, this is an alate male of *Philotrypesis*!

The reclassification of the species mentioned makes necessary some nomenclatorial alterations, as follows:

Watshamiella alata Wiebes, spec. nov., described below.

Watshamiella infida Wiebes, spec. nov., description in Wiebes, 1967: 426, figs. 77—84 (*Sycoscapteridea monilifera* (Westwood), female), 433—434, figs. 102—108 (*Philotrypesis anguliceps* (Westwood), alate male).

Watshamiella stilifera (Wiebes, 1966c), nov. comb.

These species may be recognized by using the following key.

Key to the species of *Watshamiella*

1. Funicular segments of the antenna distinctly longer than wide, with about two (sometimes irregular) rows of sensilla. Male unknown. North Borneo, ex *Ficus stupenda* Miq. *stilifera*
- Funicular segments of the antenna not longer than wide, with one row of sensilla. Female: ninth urotergite three times as long as the apparent gaster. Male: hind basitarsus longer than the three following segments combined . . . 2

2. Female: the head distinctly transverse (16 : 19); the eye not quite $1\frac{1}{2}$ times as long as the cheek (11 : 8). Male: the compound eye distinctly longer than the cheek (3 : 2). Ceylon, ex *Ficus religiosa* L. *infida*
 — Female: the head almost as long as wide (23 : 25); the eye twice as long as the cheek. Male: the compound eye as long as the cheek. Rhodesia, ex *Ficus burkei* *alata*

***Watshamiella alata* Wiebes, spec. nov.**

(figs. 61—63, 82, 85—92; pl. 2 figs. 5, 6)

Female. — Length of head, thorax and apparent gaster ca. 2 mm, the ninth urotergite ca. 3 mm i.e., three times as long as the apparent gaster. Colour yellow-brown, with black markings on the dorsum of the gaster.

Head (fig. 62) almost as long as wide across the compound eyes (23 : 25), the eye more than half as long as the head (14 : 23) and twice as long as the cheek. Antennal toruli widely spaced, situated rather low in the face, close to the epistomal margin; shallow scrobes run to about the middle of the face. Epistomal margin straight. Mandible tridentate, two glands; the labial palpus consisting of two segments (3 : 7), the maxillary of four (3 : 2 : 2 : 5). Antenna (fig. 63), formula 1135(3); the scape three times as long as the pedicel; the funicular segments with one row of sensilla, and with scattered setae.

Thorax. Pronotum long, about of the same length as the scutellum (which bears two long, posterior setae); the parapsidal furrows complete. Fore leg: the femur inflated, the tibial armature consisting of two dorso-apical spines and a bifid ventral spur, accompanied by some spines; the tarsal segments approximately in ratio 12 : 4 : 4 : 3 : 14. Mid leg: tarsal ratio 17 : 9 : 6 : 5 : 7. Hind leg: the tibia (fig. 89) with a rather straight apical edge, the armature consisting of stout spines next to the ventral spurs and six conical spines along the distal fifth of the dorsal margin; the tarsal ratio 8 : 5 : 3 : 2 : 3, i.e., the basitarsus as long as the combined lengths of the second and third segments. Fore wing (5 : 2) 1.6 mm long, the submarginal, marginal, stigmal and postmarginal veins approximately in ratio 15 : 10 : 3 : 9 (fig. 61), the surface hirsute; hind wing (4 : 1) 1.1 mm long.

Gaster shortly petiolate. Hypopygium (fig. 82) with an acute spine and three pairs of long setae. The ninth urotergite with small pygostyles.

Male. — Length of head, thorax and gaster ca. 1.7 mm. Colour yellow-brown.

Head (fig. 87) almost as long as wide across the compound eyes (13 : 14), the eye as long as the cheek. Three ocelli. Antennal toruli widely spaced, situated close to the epistomal margin, which is straight. Mandible bidentate, with two glands, but the inner tooth truncate and divided at the apex in some specimens; the labial palpus consisting of two segments (1 : 2), the maxillary of four (8 : 8 : 7 : 14). Antenna (fig. 85), formula 1135(3); the scape $2\frac{1}{2}$ times as long as the pedicel; the funicular segments with some large sensilla and mainly apical setae.

Thorax. Pronotum almost as long as the mesonotum; the parapsidal furrows almost complete. Fore leg (figs. 86, 91—92): the femur inflated, the tibial



Figs. 85—92. *Watshamiella alata* Wiebes, gen. & spec. nov., male (85—88, 90—92) and female (89). 85, right antenna, antiaxial aspect; 86, right fore leg; 87, head; 88, apex of hind tibia, and basitarsus; 89, apex of female hind tibia, axial aspect; 90, apex of gaster, with genitalia; 91, apex of fore tibia, and two tarsal segments; 92, do., detail in axial view.

armature much as in the female, the tarsal segments approximately in ratio 9 : 3 : 3 : 2 : 7. Mid leg: tarsal ratio 6 : 3 : 3 : 2 : 6. Hind leg (fig. 88) with seven conical spines along the distal third of the dorsal tibial margin and some ventral spines next to the spurs; the tarsal segments approximately in ratio 23 : 9 : 6 : 3 : 11. Fore wing (5 : 2) 1.3 mm long, the submarginal, marginal, stigmal and postmarginal veins approximately in ratio 26 : 23 : 9 : 18, the membrane hirsute; hind wing (5 : 1) 0.9 mm long.

Gaster shortly petiolate. Genitalia (fig. 90) with four claws on the claspers; pygostyles present.

Type material. — Holotype ♀ (slide-mounted), Zimbabwe-Rhodesia: Salisbury, ex *Ficus burkei*, ii.1977 (A. Watsham); deposited in RMNH, Leiden (no. 2966). Paratypes: series ♀ and four mating pairs, same data as holotype (coll. dates ii-v.1977); Chishawasha nr. Salisbury, 5 ♂, 1976 & vi.1977; Makumbi Mission, Chinamora Reserve, ex *Ficus burkei*, 5 ♀ 3 ♂, xii. 1976 (A. Watsham). The material is deposited in the RMNH, Leiden, some paratypes in the BMNH, London and in the Watsham Collection.

OTITESELLINAE

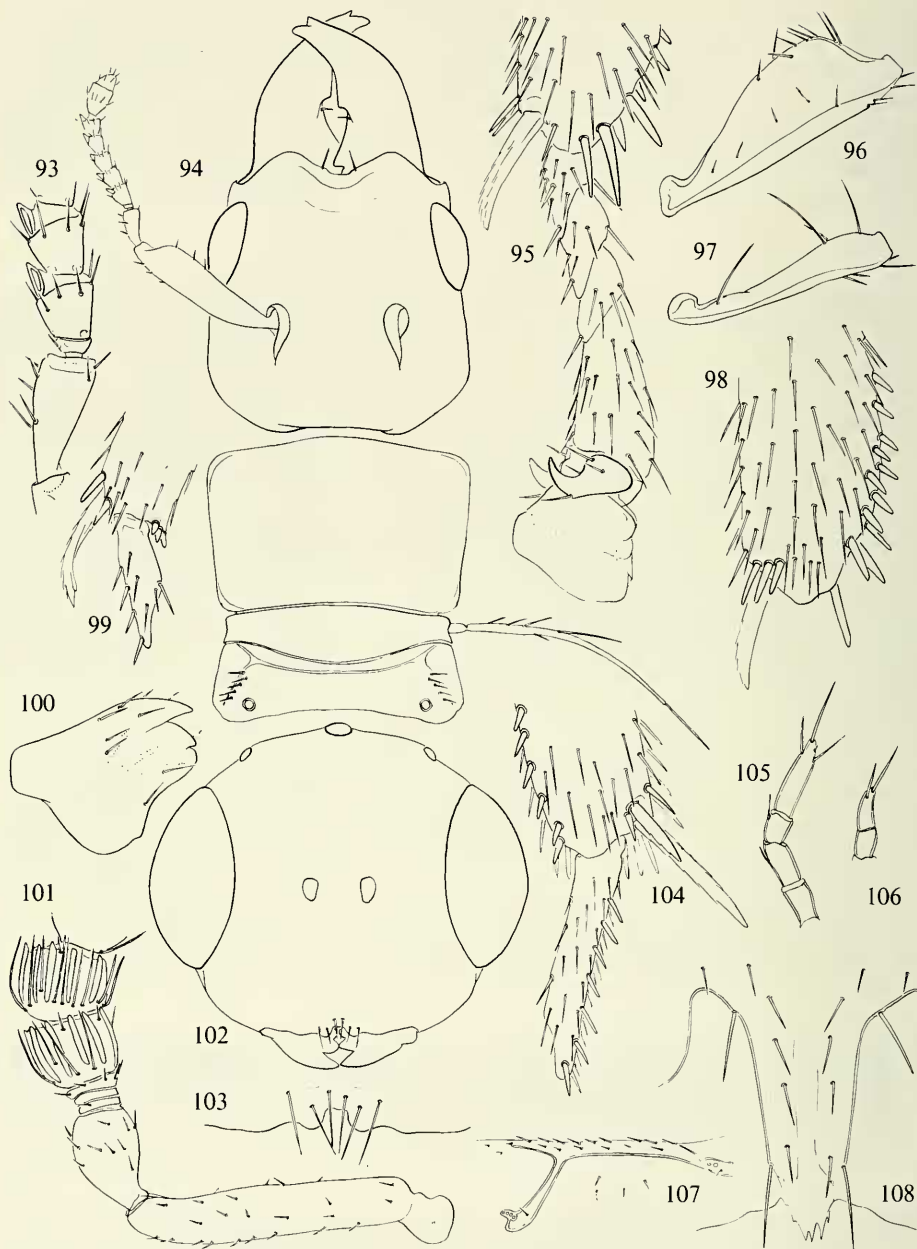
The Otitesellinae held my attention for some time (Wiebes, 1967: 435—441, 1969: 443—444, 1974: 145—161). They were formerly classified with the Torymidae, but now are transferred to the Pteromalidae. The females have a short ovipositor and for that reason were supposed to oviposit from within the receptacle; some have special features (rasps, stout spines) evidently related to the way of entering through the ostiole, but most have not. *Otitesella* Westwood, to which the species from *Ficus burkei* belongs, does not enter the receptacle for oviposition. The males are peculiar by their oversized head and mandibles. The main character by which the species of *Otitesella* and its close relatives can be distinguished, is found in the male thorax (fig. 94), the terga of which are all free; the female wings are almost hyaline. Immediate African relatives of the species here treated are *Otitesella africana* Grandi, *epicarioides* Grandi and *royi* Wiebes, with which the species from *Ficus burkei* is being compared in the following key.

Key to some African species of *Otitesella*

1. Female: epistomal margin with a median lobe in between the lateral lobes. Male: head with a large anterior concavity reaching the antennal toruli. Eritrea, ex *Ficus* spec. *epicarioides*
- Female: epistomal margin with a median indentation in between the lateral lobes. Male: head convex dorsally, only faintly impressed in front 2
2. Female: the compound eye four times as long as the cheek. Male: toruli of the antennae distinctly situated between the eyes. Guinea, ex *Ficus vogelii* Miq. *africana*
- Female: the compound eye about twice as long as the cheek. Male: toruli of the antennae almost totally behind the posterior edge of the eyes 3
3. Female: the antennal anelli long, the distal one half as long as wide. Male: antenna with two distinct anelli. Guinea, ex *Ficus* cf. *eriobotryoides* K. & B. ... *royi*
- Female: the antennal anelli (fig. 101) shorter, disk-like, up to five times as wide as long. Male: antenna with only one anellus. Rhodesia and Zambia, ex *Ficus burkei* and *petersii* *tsamvi*

Otitesella tsamvi Wiebes, spec. nov. (figs. 93—108; pl. 1 figs. 5, 6)

Female. — Length 1.4—1.7 mm. Colour blackish, the tibiae and tarsi of the legs lighter.



Figs. 93—108. *Otitesella tsamvi* Wiebes, spec. nov., male holotype (93—98) and female (99—108). 93, apex of antennal scape, pedicel and three flagellar segments; 94, head and thorax; 95, apex of fore tibia, and tarsus, axial aspect; 96—97, antennal scapes of a large- and small-sized specimen, respectively; 98, apex of male fore tibia, and basitarsus; 99, apex of female fore tibia, and basitarsus; 100, right mandible, ventral aspect; 101, basal segments of antenna, axial aspect; 102, outline of head; 103, epistomal margin; 104, apex of hind tibia, and basitarsus; 105, maxillary palpus; 106, labial palpus; 107, part of wing-venation; 108, hypopygium.

Head (fig. 102) shorter than wide across the compound eyes, twice as long as the cheek. The epistomal margin (fig. 103) broadly bilobate. Mandible (fig. 100) with three teeth; the labial palpus (fig. 106) consisting of two segments (11 : 16), the maxillary (fig. 105) of four (4 : 6 : 3 : 10). Antenna (fig. 101), formula 1135(3); the scape more than three times as long as the pedicel (13 : 4); the flagellum with five or six sensilla and long mainly basal setae visible in axial view of each segment, more and shorter setae over the whole of the disk and less sensilla in antiaxial view.

Thorax. The legs (hind leg, fig. 104) are quite similar to those of *O. epicarioides*. Fore wing (2 : 1) 1.3 mm long, the submarginal, marginal, stigmal and postmarginal veins approximately in ratio 30 : 9 : 8 : 4 (fig. 107, but in some specimens the stigmal and postmarginal are of almost equal length), hyaline, no fringe; the hind wing (4 : 1) 1.0 mm long, with a normal fringe.

Gaster. The hypopygium (fig. 108) has a short spine.

Male. — Length of the head (without mandibles) and thorax 0.9–1.0 mm. Colour yellowish.

Head (fig. 94) slightly longer than wide (greatest length: greatest width, 1.0 : 1.1), only faintly depressed above the epistomal edge and without a sulcus parallel to the posterior margin. The eyes large, more than thrice as long as the cheek (7 : 2) and more than half as long as the remaining posterior part of the head. The toruli of the antennae are situated in the posterior half of the head, well behind an imaginary line connecting the posterior margins of the eyes. Mandible two-thirds of the length of the head; three glands; the labial palpus consists of one segment, the maxillary of two (4 : 5). Antenna (figs. 93, 96–97), formula 1115(2); the scape distinctly expanded, only slightly so in smaller specimens; the pedicel about a quarter of the length of the scape; one anellus (it is difficult to distinguish between the stalk of the third segment and a possible extra anellus; even if the stalk is counted as a second anellus, there is a difference with *O. epicarioides* and *royi*, which then have three anelli: see Grandi, 1922, fig. vi 2); five subequal funicular segments, each with one antiaxial sensillum, and a divided club (2 : 1).

Thorax (fig. 94): the pronotum $1\frac{1}{2}$ times as wide as long, three times as long as the mesonotum is in the middle, and thrice as long as the propodeum is laterally. Wing remnant present. Legs (fore tibia, figs. 95, 98) much as in *O. epicarioides*.

Gaster. The claspers of the genitalia bear three claws.

Type material. — Holotype ♂ (slide-mounted), Zimbabwe-Rhodesia: Salisbury, ex *Ficus burkei*, ii.1977 (A. Watsham); deposited in RMNH, Leiden (no. 2971). Paratypes: series ♀ ♂ and 11 mating pairs, same data as holotype (coll. dates iii–iv.1977); Chishawasha nr. Salisbury, 3 ♀ 22 ♂, i, v.1975, ix.1976, i, vi.1977; Makumbi Mission, Chinamora Reserve, ex *Ficus burkei*, 35 ♀ 10 ♂, xii.1976 (A. Watsham). Zambia: Kafue National Park, Ngoma, ex *Ficus burkei*, 2 ♂, 8.xii.1977 (M. G. Bingham, no. 2465); Chipata Golf Course, ex *Ficus burkei*, 1 ♀, 11.i.1979 (M. G. Bingham, no. 2474); Chipata, ex *Ficus petersii*, 3 ♀ 7 ♂, 11.i.1979 (M. G. Bingham, no. 2475); Lusaka, Cathedral of the Holy Cross, ex *Ficus burkei*, 20 ♀ 20 ♂, 16.ii.1979 (M. G. Bingham, no. 2490). The

material is deposited in the RMNH, Leiden, some paratypes in the BMNH, London and in the Watsham Collection.

Derivation of the name. — Tsamvi is the vernacular name (Shonatribe) for *Ficus burkei*.

EPICHRYSOMALLINAE

Most of the described genera of this group were listed by Hill (1967), but so far no key to them has been published and most of them were not critically studied. Most of the descriptions were based on slide-mounted material in which it is difficult to see certain important characters and usually too much significance is ascribed to tiny differences in bristles on legs, wings and some other body parts. Unlike many other groups, in Epichrysomallinae the number of antennal segments and their shape is often different even in closely related species, often also in different sexes of the same species, and, if not corroborated by other features, seems to be of problematic value as a generic character. Unfortunately most of the existing generic descriptions were based on such characters, sometimes even on the still less reliable difference in the palpal segments. The validity of such genera was first questioned by Wiebes (1971: 382) when describing a new species from Sierra Leone. He decided then to place the species under the oldest name in the group, *Sycobia* Walker, 1871, and called it *S. africana*. Later (1975) he placed similarly another new species from the Aldabra Islands in the Indian Ocean, *Sycobia orientalis*. To my knowledge there is only one further species coming into our consideration, described by Risbec (1955a) from the Malagasy Republic (Madagascar) as *Callimomus imerinensis* (although some Indian species have been compared as well).

Epichrysomallinae seem to be confined to the tropics of the Old World and probably all are associated with figs. I have studied taxonomically at least two dozen species, some of which could be named, but am not yet quite sure about the range of some genera. The oldest genus, *Sycobia* Walker, is known to me only in the males of its type-species, *S. bethyloides* Walker from India. These males are quite distinct from the males of all African species (described or undescribed) and because it seems to me doubtful that the rather ordinary looking female assumed by some authors to belong to *S. bethyloides* really belongs there, I am reluctant to accept the name *Sycobia* for these species. The second oldest name is *Camarothorax* Mayr, 1906, based on *C. obscurus* Mayr from Java. Although I have not seen any material certainly belonging to this species (and the type material could not be located in the Mayr collection in Vienna), the description suggests a genus acceptable for most of the African species known to me. Therefore I transfer the three previously described African species to this genus and they should be known as *Camarothorax africanus* (Wiebes) comb. nov., *C. orientalis* (Wiebes) comb. nov. (both from *Sycobia*) and *Camarothorax imerinensis* (Risbec) comb. nov. (from *Callimomus*).

According to the emerging evidence Epichrysomallinae seem to oviposit into the female florets of figs. They gall them in a similar way as do the Agaonidae, but

they oviposit from outside. They are no pollinators and attack only figs of smaller size, with florets within reach of their coiled ovipositors (see Galil & Copland, 1981). If this picture of their biology proves accurate it remains to explain why their bodies are invariably so smooth (unsculptured).

Altogether four species have been found to occur in the figs of *F. burkei*, one belonging to a new genus *Sycotetra*, the remaining three to *Camarothorax* Mayr, as already mentioned also in the key above.

Sycotetra Bouček, gen. nov.

Type-species: *Sycotetra serricornis* Bouček, spec. nov.

Head in female with convex vertex, parascrobal areas and temples, and relatively deep scrobes; no interantennal ridge; occipital carina distinct only above level of foramen; in facial view head not as high as broad, with rounded converging genae; antennae inserted slightly above centre of face, distinctly above lower ocular line. Clypeus with bilobed lower margin, its median incision accompanied by round depression; dorsally not separated from supraclypeal area; its lateral margins strongly converging and just above tentorial pits less apart than one ocellus diameter, each margin then curving towards inner third of the closely approached antennal toruli. Mouth and mandibles of normal size. Antennal formula 1106(3), i.e., without distinct anellus; funicular segments very clearly separated by incisions, asymmetric, appearing distinctly serrate in the type-species (fig. 111); claval segments almost completely fused.

Thoracic dorsum virtually smooth, with few pairs of short bristles, only the pair at apex of scutellum long, upturned forwards. Pronotum medially shorter than mesoscutum; latter with strongly converging incomplete notaular lines (these not groove-like) which turn caudad at posterior end, at the medio-posterior pair of setae, still about a quarter of their length before transscutal suture. Scutellum rather broadly bordering on mesoscutum, this border about as broad as each axilla, but axillar lines anteriorly not marked as grooves on surface. Propodeum without significant sculpture; spiracle partly covered by transparent outer flange. Metapleuron hairy, its hairs much shorter than hairs on the flat propodeal callus. Mesopleuron with deep grooves separating subalar sclerite and lower epimeron, but groove indicating pleural suture (running from mid coxa to fore wing) completely effaced in ventral half. All tarsi four-segmented, basitarsus of mid and hind legs very long. Fore wing venation normal for the group, postmarginal vein however longer than half of the stigmal, which is curved and shorter than marginal vein.

Gaster sessile, slightly compressed from sides; epipygium with cerci situated dorso-laterally; hypopygium slightly exceeding three-quarters of gastral length.

In male head stouter than in female, especially temples more tumid; antennal formula 1105(3), antennal insertion below centre of face, lower margins of toruli slightly below lower ocular line; flagellum not serrate, its first segment usually smaller than any of subequal segments 2 to 5. Pronotum distinctly longer than in female and pubescence of fore wing more conspicuous. Gaster flat, subsessile.

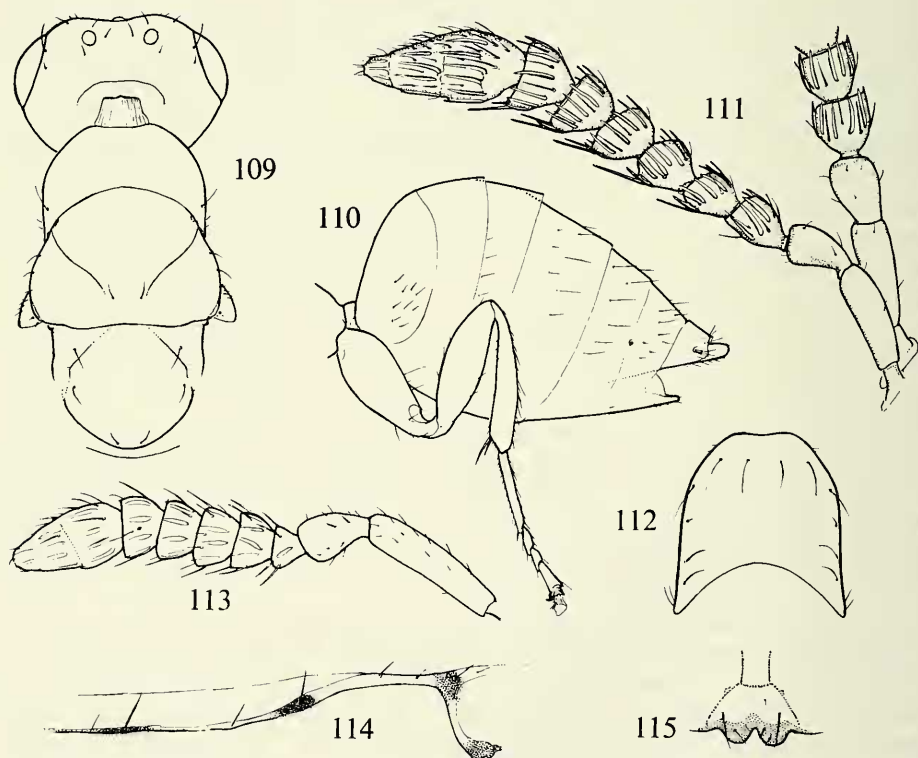
Comments. — *Sycotetra* differs from most of the known genera of Epichryso-

mallinae in having only tetramerous tarsi. These are also found in *Odontofroggattia* Ishii (1934), from which *Sycotetra* differs in having incomplete notauli, normal male mandibles (falcate in *Odontofroggattia*) and a subsessile male gaster (petiolate in *Odontofroggattia*, armed with lateral or ventral spines).

***Sycotetra serricornis* Bouček, spec. nov.**
(figs. 109—113; pl. 3 fig. 2)

Female. — Stretched body 2.0—2.7 mm. Testaceous, gaster usually darker brown; wings hyaline including most of marginal vein, venation otherwise brownish.

Head; relative measurements: breadth 85, length (dorsally) 47, height including clypeal lobes 72, breadth of frons 56, POL : OOL as 21 : 16, eye 40×32.5 , malar space 19, mouth breadth 39, distance between toruli and median ocellus 26, scapus 20×7.5 , flagellum plus pedicellus 93. Upper face with shallowly engraved striae merging at antennae with lengthened engraved reticulation. Malar sulcus obliterated, indicated merely by a narrow streak of denser reticulation. Antennal toruli about one-third of torulus apart. Flagellar segments (fig. 111) with



Figs. 109—113. *Sycotetra serricornis* Bouček, gen. & spec. nov., female (109—111) and male (112, 113). 109, head and thorax; 110, gaster and hind leg; 111, antennae, left one in lateral aspect, right antenna (part) in dorsal aspect; 112, male pronotum, dorsal aspect; 113, male antenna. Figs. 114, 115. *Camarothorax equicollis* Bouček, spec. nov., female. 114, venation of fore wing; 115, clypeus.

longitudinal plus trichoid sensilla, trichoid ones sparse on funicular segments, first segment ventrally flattened and there devoid of sensilla.

Pronotum about 0.8 of breadth of mesoscutum, its sides subparallel, anteriorly broadly rounded (fig. 109); its dorsum smooth. Flat; both hind and anterior margins of pronotum emarginate, length in median line only about 0.4 of maximum breadth and (in presumably normal position) about half as long as mesoscutum. Relative length of scutellum (less axillae) 60, breadth 50. Fore femur (less trochantellus) about 2.8 times as long as broad, about as broadened as hind femur; fore basitarsus dorsally as long as the second, mid basitarsus dorsally as long as rest of tarsus less claws, hind basitarsus relatively very slightly shorter. Fore wing venation see pl. 3 fig. 2.

Gaster hardly longer than thorax; in normal position tip of hypopygium reaching very nearly as far as apex of the spiracle-bearing tergite (fig. 110), most of hypopygium bare, except for few hairs at tip which is shortly produced (mucro).

Male. — Usually 1.5–1.8 mm (non-stretched specimens shorter, then length of body about equal to length of forewing). Antennae paler than in ♀. Head only 1.6 times as broad as long in dorsal view, with temples longer, almost parallel just behind eyes. For antenna see fig. 113. Pronotum (fig. 112) dorsally flat, its median length about 0.8 of the breadth, hind margin fairly deeply emarginate. Mesoscutum with distinct engraved striation generally parallel to notaular lines. Fore wing pubescence beginning at base of marginal vein (in ♀ bare area stretches to base of stigmal vein), similar to that shown in fig. 122.

Type material. — Holotype ♀ (on card), Zimbabwe-Rhodesia: Makumbi Mission nr. Salisbury, ex *Ficus burkei*, xii.1976 (A. Watsham); deposited in BMNH, London. Paratypes: 44 ♀ 33 ♂ (1 ♂ observed mating with holotype ♀), same data as holotype; Chishawasha nr. Salisbury, 3 ♂, xii.1974, 5 ♀, ix.1974, iii. and v.1975 (A. Watsham). Some paratypes in RMNH, Leiden and the Watsham Collection.

Camarothorax Mayr

Type-species: *Camarothorax obscurus* Mayr.

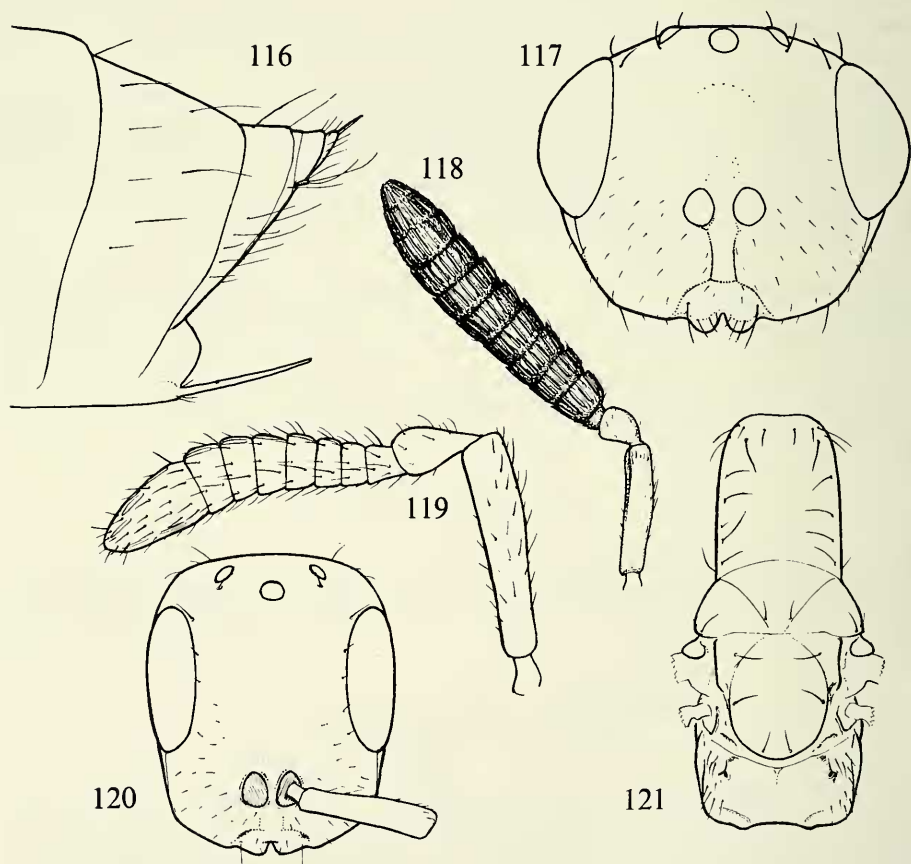
For discussion on *Camarothorax* see above, under the heading Epichrysomalinae.

Camarothorax equicollis Bouček, spec. nov. (figs. 114–121; pl. 3 fig. 3)

Female. — 2.2–2.7 mm. Reddish testaceous but often with gaster dark brown (except for paler base), as well as mesopleura, metathorax plus propodeum, antennal flagellum and legs except tarsi. Wings hyaline, including parts of venation which alternate with darker colour at base, middle and apex of submarginal vein and at base and apex of stigmal vein.

Head orthognathous, scarcely broader than mesoscutum (36 : 34), in dorsal

view fully 1.9 times as broad as long (stout), in facial view (fig. 117) barely 1.2 times as broad as high. Relative measurements: head width 89, frons 53, POL : OOL as 23 : 13, eye 40×34 , malar space 27, mouth 44; toruli 30 from lower margin of clypeal lobes, 20 from eye and 32 from median ocellus; slender scapus 31, flagellum plus pedicellus 86. Vertex very weakly convex, with bristles as in ♂ but without short ones mesad and laterad of ocelli; also sculpture and pilosity similar to that of male. Occipital carina conspicuous and complete, reaching mouth margin on hind side of head; temples rounded, short. Lower face with some very short hairs, longer hairs present only at mouth margin and on mandibles; clypeus subtriangular, its lower margin with two deeply separated lobes (fig. 115), dorsal margin against supraclypeal area indicated by dark line, supraclypeal area itself narrower than one torulus, almost parallel-sided, about three times as high as broad. Malar groove distinct. Antenna (fig. 118): pedicellus short; flagellum stout except for thin anellus, with seven funicular segments, all of them transverse, distal ones usually about twice as broad as long; formula 1117(3).



Figs. 116—121. *Camarothorax equicollis* Bouček, spec. nov., female (116—118) and male (119—121). 116, apex of gaster in lateral view; 117, head; 118, antenna; 119, male antenna; 120, male head; 121, male thorax, dorsal aspect.

Thorax shiny, with similar fine engraved striae as head; dorsally with two bristles on each side of pronotum, two posteriorly at each outer corner of mesoscutum, the meso-posterior pair more than twice from each other than from scutellum; on scutellum one pair of lateral bristles in middle of length and another pair at hind margin. Pronotum distinctly narrower than mesoscutum, its median length to breadth in ratio as 26 : 62; anterior corners broadly rounded. Notaular grooves shallow, posteriorly sinuate and meeting scutellum slightly inside of axillar grooves; latter grooves separated from each other by little less than breadth of one axilla (21 : 26). Relative length of scutellum 59, breadth 53, median length of propodeum 20. Propodeum with fine median carina accompanied by a groove connected anteriorly with a broader groove running along anterior margin, narrowing laterad and subdivided in several areolae; short carinae arising also from raised petiolar margin of propodeum; spiracle round, less than its diameter from metanotum, anteriorly overroofed by transparent flange; callus with long hairs, these reduced posteriorly to hardly more than one row. Metapleuron convex, reticulate, bare. Mesopleuron ventrally very flat, dorsally with longitudinal striation; a curved groove separating subalar sclerite, a distinct bent groove delimiting lower epimeron (katapimeron). Fore femur and hind femur each about three times as long as broad. Fore wing pilosity strongly reduced, hairs extremely short, sparse, marginal fringe absent; bristles of veins reduced to a few on darker parts of venation (fig. 114); relative measurements: costal cell length about 115, marginal vein 26, postmarginal 9, stigmal 18.

Gaster sessile, only moderately compressed from sides, hardly as long as thorax. Cerci close to each other, on ventral side. Hypopygium ending slightly beyond middle of gaster but with thin white median projection (mucro, fig. 116) about of length of hind basitarsus.

Male (pl. 3 fig. 3). — Stretched body 1.9–2.7 mm (holotype 2.6 mm). Dark brown, but mesothorax dorsally sometimes more or less testaceous; antennae, fore tibia and all tarsi testaceous. Wings slightly infumate but hyaline in basal one-third sending out a curved hyaline streak, also quadrangular area below marginal vein hyaline; venation brown, but marginal vein pale.

Head subprognathous, elongate-subquadrangular (fig. 120). Relative measurements: breadth 65, thickness 44, height (here = length) 78, breadth of frons 39, POL : OOL as 19 : 12, eye 38×26, malar space 23, width of mouth 44, distance between toruli and median ocellus 42, scapus length 37, pedicellus plus flagellum 69. Surface of body shiny, with very fine shallow engraved striation; short hairs scattered on lower face, spreading partly along inner orbits and across genae to temples; on vertex regular bristles: one in front of each lateral ocellus, one antero-laterad from that ocellus at eye margin, four bristles in cross-arch on vertex and a short bristle mesad of each lateral ocellus. Occipital carina even dorsally indistinct. Malar sulcus fine but distinct. No supraclypeal area, and clypeus ill-defined dorsally, very transverse, lobes of lower margin as if converging, separated by a subtriangular incision. Antennal insertion about half-way between ocular line and mouth margin, toruli close to each other. For antenna see fig. 119, formula 11071; scapus straight; first flagellar segment undivided,

distinctly longer than following one but scarcely as long as pedicellus; clava not distinctly subdivided.

Thorax with fine striation similar to that on head, dorsally slightly flattened, in shape slightly widening caudad (fig. 121), in stretched position about 2.5 times as long as broad. Pronotum about 1.2 times as long as broad, its hind margin only shallowly emarginate; sides subparallel. Mesoscutum (if pronotum in horizontal position) fully twice as broad as long, only half as long as pronotum; notauli extremely shallow though groove-like, very nearly complete, almost meeting on scutellar border. Scutellum about 1.2 times as long as broad, most of border with axilla indistinct. Propodeum subhorizontal, without significant sculpture, only medio-anteriorly with faint converging grooves separated by short fine carina. Metapleuron and mesopleuron as in female, only with odd hairs in front of mid coxae. Legs strong but tibiae and tarsi relatively long and slender; hind coxa pyriform, dorsally and laterally bare; fore femur stout, 2.1 times as long as broad, hind femur about 2.9 times as long as broad; mid basitarsus dorsally slightly shorter than combined dorsal length of segments 2 to 4. Proximal third of fore wing bare except basal cell and apex of costal cell, bare area stretching to base of stigmal vein; otherwise distinctly pubescent, hairs moderately dense; marginal fringe conspicuous; bristles on submarginal vein absent only on a short stretch just before parastigma.

Gaster flat, mostly short-oval.

Type material. — Holotype ♂ (on card), Zimbabwe-Rhodesia: Makumbi Mission nr. Salisbury, ex *F. burkei*, xii.1976 (A. Watsham); deposited in BMNH, London. Paratypes: 12 ♀ 5 ♂, same data as holotype; Chishawasha nr. Salisbury, 11 ♀ 8 ♂, ix. and xii.1974, vii.1976, iii. and iv.1977 (A. Watsham). South Africa: Pondoland, Port St. Johns, 1 ♀, vii.1923 (R. E. Turner). Uganda: Kawanda, 1 ♀, ii.1939 (T. H. C. Taylor). Some paratypes in RMNH, Leiden and the Watsham Collection.

Comments. — This species, especially by its long "horse" head and pronotum (hence its name *equicollis*) reminds one much of *Camarothorax orientalis* (Wiebes) described in *Sycobia* from the Aldabra Islands (1975). *C. equicollis* differs from *C. orientalis* (of which I could examine the type material) in the female mainly by the lateral ocellus being nearer to the median ocellus than to the eye (the reverse in *orientalis*), a different disposition of hairs on the vertex, a slightly more transverse head (in frontal view), a much shorter pronotum (median length to breadth in *orientalis* as 13 : 26), and by the distinctly compressed gaster (not compressed in *orientalis*); in the male by the relatively less elongate head with larger eyes which are much longer than part of head anterior to eyes in *equicollis*, but only about as long in *orientalis*.

The above material of *C. equicollis* comes mainly from the Rhodesian *Ficus burkei*, but a very similar form is known to us from the figs of *F. petersii* from South West Africa (Namibia). The latter form cannot be separated morphologically but is much darker, having only the pronotum and lower parts of the head pale testaceous. I regard it as a form of *C. equicollis*, although the material is not included as paratypes (it may be a climatic form, or does the colour difference suggest a beginning of speciation?)

***Camarothorax longimucro* Bouček, spec. nov.**
(figs. 122—125; pl. 3 fig. 4)

Because of great similarity of this species to *C. equicollis* the stress is made in the following description on the diagnostic characters.

Female. — 2.05—2.35 mm. Testaceous, but propodeum and gaster sometimes slightly darker than the rest; wings hyaline, venation with a pattern similar to *equicollis* but generally paler.

Head in dorsal view transverse-quadrangular, about 1.85 times as broad as long, with swollen temples which are subparallel for short distance at eyes; in facial view (fig. 125) head nearly 1.2 times as broad as high. Sculpture on head, as well as on thorax, similar to that of *equicollis*, but deeper, therefore surface duller. Relative measurements: head breadth 83, frons 51, POL : OOL as 22 : 14, eye 34×29, malar space 24, mouth 42, toruli 25 from lower margin of clypeal lobes and 33 from median ocellus (lower torular margin on lower ocular line), scapus 31, flagellum plus pedicellus 82. Ocellar angle about 135°, ocellar area about three times as broad as high. Compared with *equicollis* eyes are smaller, supraclypeal area (separated by distinct line from clypeus, fig. 125) is only about twice as high as broad, as broad as one torulus; antennae inserted slightly lower on face, pedicellus fully 1.6 times as long as broad, flagellum slightly more slender, with only six funicular segments.

Pronotum parallel-sided, only 0.75 times as broad as mesoscutum, its median length about 0.47 the breadth; anterior corners (shoulders) subrectangular. Notaular grooves meeting scutellum slightly outside of axillar grooves; latter grooves separated anteriorly by distance subequal to half breadth of axilla. Scutellum about 1.15 times as long as broad, posteriorly more regularly semicircular than in *equicollis*, but propodeum and sculpture of pleura as in that species, except that metapleuron is narrower, hind lateral corner of propodeum slightly more produced, the groove delimiting subalar sclerite ventrally is straight. Legs relatively slender; fore femur about 2.5 times, hind femur nearly 3 times as long as broad; hind basitarsus dorsally about as long as rest of tarsus (less pulvillus). Fore wing as in *equicollis*, relative length of costal cell 120, marginal vein 26, postmarginal 10, stigmal vein 21.

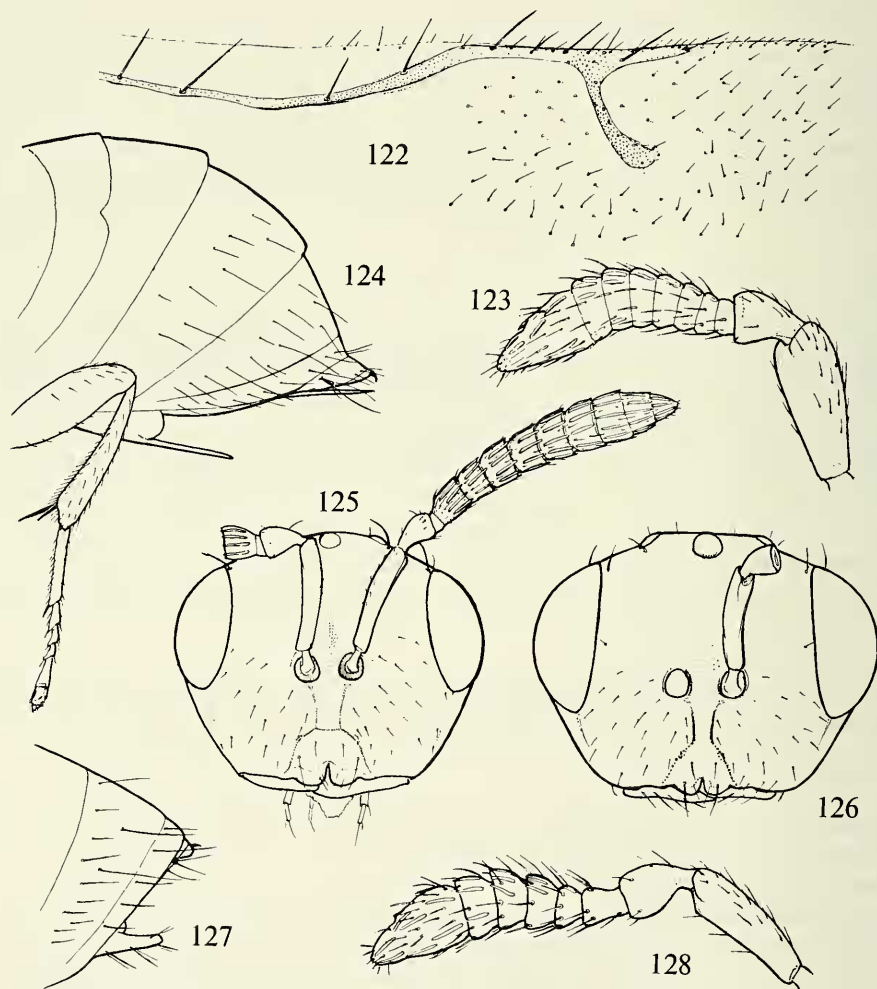
Gaster sessile, fairly compressed from sides, about as long as head plus thorax combined. Hypopygial mucro slender (fig. 124), about as long as two basal segments of hind tarsus combined. Cerci situated ventrally, close to each other.

Male. — About 1.7—1.9 mm (if stretched). Pale testaceous (only eyes, ocelli and pulvilli dark); fore wing venation (fig. 122) pale, only parastigma and stigmal vein more pigmented.

Head almost orthognathous (mouth downwards), in facial view fully 1.1 times as broad as high. Relative measurements: breadth of head 71, length (dorsally) about 40, height 62, frons 42, eye 34×26, malar space 16, scapus 25×9, flagellum plus pedicellus 55. Occipital carina fine and developed only dorsally. Head narrower in temples than across eyes but temples parallel for short distance just behind eyes; a few additional hairs posteriorly on vertex; two pairs of dorsal adorbital bristles (one pair in *equicollis*). Antennal toruli situated below lower

ocular line; supraclypeal area short, with sides diverging upwards, ventrally separated by distinct line from clypeus. Antenna short and stout, clavate (fig. 123); scapus slightly narrowed basally; flagellum more distinctly tapering towards base; seven distinct funicular segments, no anellus.

Thorax long, with large pronotum which is about 0.85 times as broad as mesoscutum, but normally (in subhorizontal position) distinctly longer; maximum length of pronotum equal to breadth, but because of emargination of hind margin, in median line shorter than broad as 45 : 54, broadly rounded anteriorly; pronotum dorsally nearly smooth, with 4 to 6 bristles in an anterior cross-line, one pair of sublateral bristles behind this row and 4 bristles at hind margin (submedian ones more apart). On propodeum the T-shaped groove obliterated;



Figs. 122—125. *Camarothorax longimucro* Bouček, spec. nov., male (122, 123) and female (124, 125). 122, venation of fore wing; 123, antenna; 124, female gaster and hind leg; 125, female head and antenna. Figs. 126—128. *Camarothorax brevimucro* Bouček, spec. nov., female (126, 127) and male (128). 126, head; 127, apex of gaster; 128, male antenna.

also grooves on mesopleuron almost obliterated. Legs strong and stout; fore femur hardly 2.1 times, hind femur about 2.4 times, as long as broad; fore tarsal segments 1 to 4 very short; hind tibia dorsally bristly; hind basitarsus dorsally about as long as segments 2 plus 3 combined (dorsally). Fore wing (fig. 122) with pilosity similar to that of *♂ equicollis*; on lower surface pubescence extending partly to marginal vein.

Gaster flat, much shorter than thorax.

Type material. — Holotype ♀ (on card), Zimbabwe-Rhodesia: Chishawasha nr. Salisbury, ex *F. burkei*, vi.1977 (A. Watsham); deposited in BMNH, London. Paratypes: same origin as holotype, 2 ♂, 3.xii.1974 and 5 ♀, 1976. Some paratypes deposited in RMNH, Leiden, PPRI (Plant Protection Research Institute), Pretoria and the Watsham Collection.

Comments. — The name of *C. longimucro* refers to the unusually long spine-like projection (mucro) of the female hypopygium. In this respect the species is similar to *C. equicollis*. The female looks otherwise very much as that of *C. brevimucro*, especially in the antennae, but the males of the two species have very different antennae and the female of *C. brevimucro*, as the name suggests, has only a short projection on its hypopygium. *Camarothorax longimucro* is also similar to *C. africanus* (Wiebes) from West Africa. The latter species differs from *C. longimucro* by its larger size, and in both sexes by a more robust body with a stout head which looks subquadrangular dorsally and is, in female, only about 1.65 times as broad as long, with the occipital carina nearly reaching the level with ocelli (this carina much lower in *longimucro*), the pronotum with almost parallel sides and longer, in female medially about 0.6 times as long as broad, in both sexes of *C. africanus* the axillar grooves are rather strongly converging forwards, thus considerably narrowing the anterior margin of the scutellum, and the clypeus is distinctly separated from the supraclypeal area (as in *C. longimucro*, fig. 125, but unlike in the otherwise also similar *C. brevimucro*, fig. 126).

***Camarothorax brevimucro* Bouček, spec. nov.**

(figs. 126—128; pl. 3 fig. 5)

Female. — 1.3—2.5 mm (holotype 1.8 mm). Testaceous to dark brown, sometimes either pale or dark, usually pale colour spreading first on sides of pronotum, then on lower parts of head and in a streak on sides of thoracic dorsum including fore coxa, prepectus and sides of scutellum (so in holotype). Wings hyaline, venation uniformly pale brown. Otherwise very similar to *C. longimucro*, hence stress is made on diagnostic characters.

Head with occipital carina reaching higher up than in *longimucro*, therefore vertex less sloping posteriorly. Ocellar area about twice as broad as long, angle of ocelli about 120°. In facial view (fig. 128) head rather transverse, about 1.37 times as broad as high; clypeal lobes rather short, clypeus dorsally confluent with supraclypeal area. Relative measurements: breadth of head 78, frons 48, POL : OOL as 18 : 11, eye 34×29 (rather large), malar space 20 (relatively

short), scapus 22, flagellum plus pedicellus about 60. Flagellar segments mostly more transverse than in *longimucro*.

Thorax slightly stouter than in *longimucro*; median carina on propodeum reduced to mere rudiment anteriorly; several bristles on dorsal part of metapleuron. Fore and hind femur each about 2.5—2.6 times as long as broad. Relative measurements in fore wing: costal cell length 95, marginal vein 18, postmarginal about 6, stigmal vein 18 (the marginal relatively short).

Gaster sessile, only moderately compressed from sides, about as long as thorax. Hypopygium reaching near to apex of gaster, its median projection (mucro) short (fig. 127; hence the name).

Male. — 1.4—1.9 mm. Mainly yellowish but often with darkened gaster and, usually less distinctly darker on vertex and on median parts of thoracic dorsum. Wings mostly hyaline but sometimes slightly infumate, mainly with a faint median streak and more infumate in basal half where a strongly curved line following the cubital vein and another longitudinal streak along hind margin are left hyaline.

Very similar to ♂ of *longimucro* but body less slender and antennae only with five segments between pedicellus and clava (fig. 128); clypeus dorsally fused with supraclypeal area; vertex subhorizontal behind ocelli, relative distance between lateral ocelli (POL) 18, both only 14 from distinct occipital carina; length of pronotum medially about 0.65 the breadth, in two-thirds of length with a pair of submedian bristles. Fore femur nearly 2.3 times as long as broad (hind femur barely more slender); fore tarsus very short; hind basitarsus about as long as three following segments combined, measured dorsally. Fore wing pilosity about as in *C. equicollis*: relative length of marginal vein 22, postmarginal about 3 (indistinct), stigmal vein 19. Gaster subpetiolate, flat, short oval; median length of petiole barely a third of maximum breadth.

Type material. — Holotype ♀ (on card), Zimbabwe-Rhodesia: Makumbi Mission nr. Salisbury, ex *F. burkei*, xii.1976 (A. Watsham); deposited in BMNH, London. Paratypes: same data as holotype, 100 ♀ 109 ♂; Chishawasha nr. Salisbury, 24 ♀ and 8 ♂, ix.1974 and 1976, ii.iii. and vi.1977; Chinamora Reserve, 1 ♀, iii.1975 (all A. Watsham). South Africa: Pondoland, Port St. Johns, 1 ♀, viii.1923 (R. E. Turner). Some paratypes deposited in RMNH, Leiden, PPRI, Pretoria and the Watsham collection.

Comments. — The main characters separating this species are summarized in the key and in the comments on *C. longimucro*. The male of *C. brevimucro* is similar in many features to that of *Sycotetra serricornis*, but it has complete notaular grooves, five-segmented tarsi and differs otherwise in various details mentioned in the description.

EURYTOMINAE

Figs, even if inhabited only by the pollinating Agaonidae, represent an ecological niche virtually identical to many plant galls and as such attract many

species of gall-inhabiting Eurytomidae. All the African species associated with figs belong to subfamily Eurytominae, as defined by me earlier (e.g., in Peck, Bouček & Hoffer, 1964 : 23) and quite recently by Subba Rao (1978). There seems to be no good reason to split the subfamily, as some authors traditionally did. Eurytominae include a variety of genera, with numerous species both of phytophagous and entomophagous habits.

There are still considerable difficulties with the range of many genera and it proved the best way to place two of the species associated with *Ficus burkei* into two new genera, whilst the majority belongs to *Sycophila* Walker and one species can be undoubtedly classified as *Eurytoma* Illiger. Their separation is summarised in the key, based mainly on practical characters (not necessarily of generic value, as some, e.g., in *Eurytoma ficusgallae*).

Eurytoma Illiger

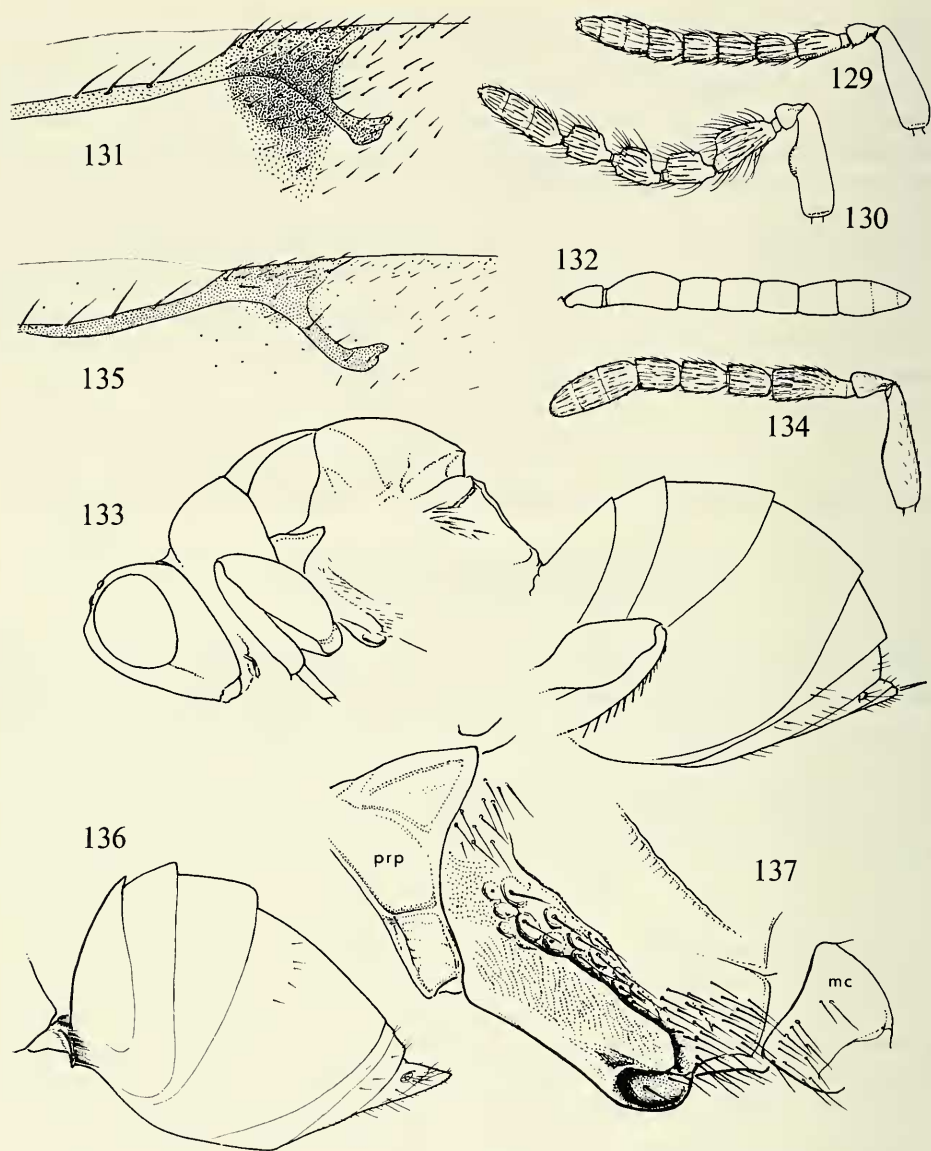
One species, apparently undescribed, belongs to this well known genus.

Eurytoma ficusgallae Bouček, spec. nov. (figs. 129—130; pl. 3 fig. 6)

Female. — 2.5—3.4 mm (holotype 3.3 mm). Black; head and thorax with short silvery pubescence; antennae, tegulae, venation and legs beyond coxae rufous, tarsi paler, sometimes pedicels infuscate, rarely also femora; wings hyaline.

Head dorsally twice as broad as long, anteriorly 1.4 times as broad as high; densely umbilicately punctured, including malar space, but on lower face punctures confluent into grooves separated by raised striae radiating from depressed clypeal margin. Frons convex but not bulging; deep scrobes barely narrower than parascrobal area, its edges carinate, especially in upper third, united at ocellus, in a slight depression. Inner orbits with slight carina. Hairs on face very dense and flattened, arranged as if radiating from antennal base; lower edge of toruli at half distance between median ocellus and the emarginate mouth margin; on lower face median stria raised slightly more than others. In frontal view, mouth margin medially distinctly emarginate and depressed (including clypeus) but raised laterad of clypeus, narrowly notched above base of each mandible so that genal lamina projects there as a tooth; malar sulcus absent. Relative measurements: head width 55, frons 34, POL 12.5, OOL 7, eye 22×20, malar space 18.5, scapus 17×5, flagellum plus pedicellus 52. Antenna 11153; scapus reaching top of median ocellus, distinctly tapering in apical third (fig. 129); pedicellus subglobose; funicular segments oblong, the first distinctly, the fifth only slightly longer than broad, all with sparse longitudinal sensilla.

Thorax: densely punctate; dorsum about 1.43 times as long as mesoscutum broad; pronotal sides rounded, anteriorly slightly carinate (carina vertical). Hind margin of mid lobe of mesoscutum in middle slightly produced. Tegula distinctly striate-reticulate at hind margin. Scutellum rather flat, at apex broadly rounded (almost truncate) and with hairs directed towards median line; axillula impunctate, well delimited even dorsally, its posterior subvertical border out-



Figs. 129, 130. *Eurytoma ficusgallae* Bouček, spec. nov. 129, female antenna; 130, male antenna. Figs. 131—134. *Ficomila gambiensis* (Risbec), female (131—133) and male (134). 131, venation of fore wing; 132, antenna (less scapus); 133, body in lateral view; 134, male antenna. Figs. 135—137. *Ficomila curtivena* Bouček, gen. & spec. nov., female. 135, venation of fore wing; 136, gaster; 137, lateral aspect of part of thorax, showing prepectus (prp), mesopleuron with characteristic feature of the genus, and mid coxa (mc).

standing. Propodeum steep; the irregularly round large median area only slightly depressed, with low weak cross-carinae arranged as a tree: lower ones nearly horizontal, upper ones increasingly turning upwards; bottom between them reticulate; margins of area partly carinate against the foveolate-areolate

convex sublateral parts. Mesopleuron in posterior part horizontally rugulose-striate, anteriorly with epicnemial area delimited by subparallel low keels and containing a partly doubled row of piliferous puncta. Mesosternal shelf distinctly delimited by wavy carina, its minimum length (in front of each mid coxa) equal to breadth of fore tibia; ventral surface hairy, with a few hairs also in front of the shelf carina. Fore coxa anteriorly hairy, with strong oblique lamina beyond basal third; mid coxa without auricular lamella. Hind tibia on dorsal edge with a row of about 9 slightly alternating bristles, longest one as long as inner spur. Fore wing with marginal, postmarginal and stigmal veins subequal in length; basal cell hairy in distal third; costal cell pubescent on ventral surface but dorsally bare.

Gaster sessile, about as high and long as thorax but narrower, compressed, though not keeled dorsally; in median line tergites 2, 3 and 4 subequal in length. Surface smooth, but beginning with fourth tergite finely punctulate; fourth tergite sublaterally at base with a row of hairs which is more complete on the fifth, sixth tergite wholly hairy; epipygium very short, barely up-turned.

Male. — 1.7–3.0 mm. Pubescence on head and thorax, especially on face, golden. Flagellum brownish, with 4 bristly funicular and 3 claval segments (fig. 130). Scapus with distinct granulate boss beyond middle; first funicular segment distinctly elongate, segments 2 to 4 subequal, very slightly longer than broad. Antennal insertion distinctly above middle of face. Median area of propodeum more coarsely sculptured than in ♀. Gastral petiole about 1.5 times as long as broad, laterally and anteriorly carinate, dorsally rather flat, granulate, anterior crestlike margin arcuate.

Type material. — Holotype ♀: Zimbabwe-Rhodesia: Chishawasha nr. Salisbury, xii.1974 (A. Watsham); deposited in BMNH, London. Paratypes: 13 ♀ and 9 ♂, same origin as holotype, mostly reared from galled figs of *F. burkei*, ii.1974, iii.-xi.1975, ii.1976; 15 ♀ and 4 ♂, Makumbi Mission nr. Salisbury, same host, xii.1976 (all A. Watsham). Some paratypes deposited in RMNH, Leiden and in the Watsham collection.

Comments. — *Eurytoma ficusgallae* seems to be easily separable from all the described African species of the genus. By the combination of the well delimited (carinate) mesosternal shelf and the presence of an oblique laminate carina on fore coxa, *E. ficusgallae* approaches the *nodularis*-group of *Eurytoma*. However, unlike the latter group, it has the coarse radiating striation on the lower face, with a medially emarginate and depressed mouth margin. This character, combined with the mesosternal shelf, is present in the *braconidis*-group (parasites in cocoons of Braconidae and Ichneumonidae, etc.), but there the shelf is differently formed (not well delimited laterally), the massive genal carina merges smoothly with the sublateral mouth border and there is a pair of outstanding carinae below the antennae, instead of a median carina as in *ficusgallae*. The facial radiation reminds one also of the *robusta*-group but in those species the fore coxa has on its anterior face just a shallow longitudinal channel, not a laminate carina. This carina is further present in the *latrodecti*-group (called *Desantisca* by Burks; parasites in spider egg-cocoons) the species

of which much resemble *E. ficusgallae* also in many other characters and are also similar and closely related to the *braconidis*-group. The *latrodecti*-group differs in having a relatively deep reticulation on the tegulae and in female sex loose funicular segments.

Syceurytoma Bouček, gen. nov.

Type-species: *Syceurytoma ficus* Bouček, spec. nov.

Body generally in shape and sculpture as in most *Eurytoma* species, i.e., with head and thorax densely umbilicately punctured, with very short pubescence. Head transverse; scrobes reaching ocellus, not broader than parascrobal area. Interantennal crest small but high, doubled by broad median groove. Lower face coarsely striate, median stria slightly raised; striae radiating from lower clypeal margin which is slightly bilobed: lobes separated by depression in emargination; tentorial pits indistinct. Malar sulcus slightly indicated, about as long as shorter diameter of the relatively small eye. Gena posteriorly with strong laminate carina joining ventrally the reflexed-carinate mouth border. Occipital carina low, ending near middle of posterior genal carina by a small tooth and this connected by horizontal carina with hypostomal carina (which delimits the cavity containing mouth organs). Antennae inserted slightly above middle of face, formula in female 11153, with scape narrowed apically and with small anellus; in male 11143, with funicular segments more distinctly constricted at both ends, longer and more hairy: hairs semidistant and about as long as breadth of segments and mostly not distinctly whorled (fig. 140).

Pronotum large and virtually as broad as, and slightly longer than, the mesoscutum; antero-laterally with vertical carina. Scutellum as in *Eurytoma*; axillulae not well delimited. Propodeum steep, medially depressed, irregularly alveolate, anteriorly with two carinae diverging from middle as in *Sycophila*. Mesopleuron anteriorly delimited by epicnemial strip which is reduced in ventral half to single carina; this carina becomes high laminate where turning mesad, there marking off short mesosternal shelf; more mesad carina lowered and joining in median line a double rounded projection (fig. 138); this projection is strongly excavated from either side and anteriorly connected with two weaker subparallel carinae, each with a side branch. Fore coxa laterally carinate but its anterior face rather flat, with slight meso-distal depression. Fore wing much as in *Sycophila*: marginal vein strongly enlarged (more so in male than in female), accompanied by a slight infuscation; postmarginal and stigmal veins short (fig. 139).

Gastral petiole subquadrate in female, in male distinctly elongate, dorsally flat, anteriorly expanded on sides (fig. 141), with sharp anterior crest. Gaster globose, in female broad and dorsally only weakly convex, with third tergite the longest.

Comments. — The new genus is proposed, rather reluctantly, for a distinctive species which shows affinities both to *Eurytoma* Illiger and *Sycophila* Walker. It is described after an attempt at a critical analysis of the characters used previously as generic characters, but also including a number of new ones. The only

alternative to this generic separation would be a union of many genera of the former Eurytominae, Eudecatominae and Harmolitinae, which, indeed, I regard all as belonging to Eurytominae (in Peck, Bouček & Hoffer, 1964: 23). These subfamilies are still maintained by some authors, in my opinion without good reason.

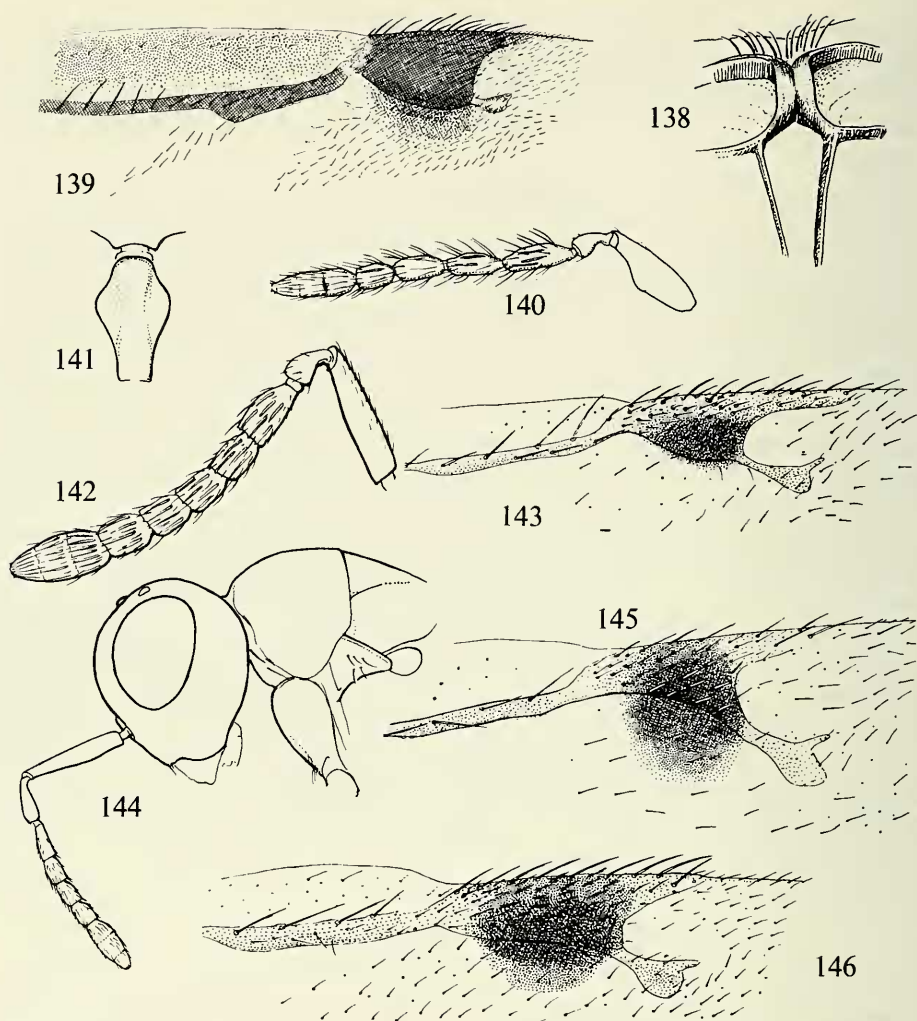
Another genus which to some extent intergrades between *Eurytoma* and *Sycophila* is *Paradecatomia* Masi. It was originally based on a single female named *Paradecatomia bannensis* Masi from Somalia but is known to me now in both sexes from Ethiopia (Harrar), Yemen, Tanzania and South Africa (Port St. Johns). Some specimens were apparently reared but no host data are attached. *Paradecatomia* has the posterior genal carina (I think that "postgenal carina" of Claridge is rather occipital carina) strong and complete as in *Syceurytoma* and most *Eurytoma*, but has, apart from other characters, an impunctate boss on malar space, the lower margin of clypeus with a small median tooth, a cross-striate and hairy anterior face of fore coxa, a coarsely punctured and hairy long mesosternal shelf which is anteriorly not carinate but abruptly turning smooth, and the male antennal flagellum with six two-whorled funicular segments plus an indistinctly 3-segmented clava. The bristly male flagellum puts *Paradecatomia* nearer to *Eurytoma*, but again the marginal vein is enlarged and stigmated by infuscation, although short and with certain similarity to the genus described here below, *Ficomila*. In the Eurytominae the posteriorly rounded gena seems to indicate, at least to some extent, a degree towards phytophagy, as suggested by the rounded gena in *Tetramesa* Walker, *Systole* Walker, *Bruchophagus* Ashmead (and the extremely close *Risbecoma* Subba Rao, 1978, based on the supposedly parasitic *Eurytoma bruchocida* Risbec which is in fact phytophagous in the *Acacia* seeds!). If this hypothesis works, both *Syceurytoma* and *Paradecatomia* should be parasitic in habit.

***Syceurytoma ficus* Bouček, spec. nov.**

(figs. 139—141; pl. 4 figs. 1, 2)

Female. — 2.1—3.4 mm. Ochreous to rufous, sometimes (especially in small specimens) with black spreading from median line on thorax and vertex.

Head; relative measurements: breadth 68, length 36, height 52, frontovertex 45, POL 13, OOL 13, eye 24.5×20, malar space 22, scape 21.5, flagellum plus pedicellus 59. Fine granulate reticulation on scapus confluent near base into cross-striation. Narrow interstices of umbilicate punctures on head and thorax reticulate. Punctured thoracic dorsum only about 1.44 times as long as broad. Anterior margin of pronotal collar broadly emarginate in middle, its sides longer than half its breadth (33 : 62). Scutellum barely longer than broad. Propodeum rather steep, convex, except for shallow median depression; mainly irregularly alveolate behind two carinae diverging from middle anteriorly and arcuately turning to anterior end of spiracles; sometimes median depression partly delimited by subparallel irregular carinae (more often in smaller specimens). Exposed part of prepectus concave, about as large as tegula, separated by a carina from the normally concealed part which is broad channel-like. Fore wing: costal cell dorsally nearly bare but densely pubescent underneath; basal third of



Figs. 138—141. *Syceurytoma ficus* Bouček, gen. & spec. nov., female (138) and male (139—141). 138, characteristic sculpture on mesosternal part; 139, venation of male fore wing; 140, male antenna; 141, gastral petiole of male. Figs. 142, 143. *Sycophila kestraneura* (Masi), female. 142, antenna; 143, venation of fore wing. Figs. 144, 145. *Sycophila punctum* Bouček, spec. nov., 144, male head with antenna and part of thorax; 145, venation of female fore wing. Fig. 146. *Sycophila sessilis* Bouček, spec. nov., venation of female fore wing.

wing below submarginal vein mainly bare, but basal fold with hairs in 1 or 2 rows; parastigma distinctly enlarged; marginal vein broader than length of stigmal vein, its lower margin slightly convex.

Gastral body broadly convex; exposed part of third tergite nearly to about twice as long as the second, both smooth; epipygium very short, transverse, barely up-turned.

Male. — 1.45—3.4 mm. Thorax usually with black widespread, more than in

darkest female, sometimes whole dorsal side of body black, rarely wholly ochreous as in most females. Antenna in most specimens not appearing very bristly (fig. 140) but bristles often more outstanding in smaller specimens and then fourth funicular segment with two whorls. For gastral petiole see fig. 141, for fore wing venation fig. 139, made from a specimen of size over 3 mm; smaller specimens have hairs relatively sparser, in large specimens also wing blade is partly infusate.

Type material. — Holotype ♀: Zimbabwe-Rhodesia: Chishawasha nr. Salisbury, from *F. burkei* (= "*natalensis*"), 10.xii.1974 (A. Watsham); in BMNH, London. Paratypes: 104 ♀ and 61 ♂, same origin as holotype, xi.1974—vi.1975, ii.1976; 38 ♀ and 5 ♂, Makumbi Mission nr. Salisbury, iv.1975 and xii.1976 (all A. Watsham). Uganda: Kampala, "ex stem galls on *Ficus sycomorus*", 3 ♀, 3 ♂, 8.x.1935 (H. C. Taylor). South Africa: 1 ♂, Zululand, Eshowe, iv.1926 (R. E. Turner); 1 ♀, 1 ♂, Natal, Weenen, xi.1923 (H. P. Thomasset); 3 ♀, Pondoland, viii. and xi.1923 (R. E. Turner); 1 ♀, East London, v.1923 (N. K. Munroe). Paratypes are deposited in RMNH, Leiden and in the Watsham collection.

Ficomila Bouček, gen. nov.

Type-species: *Ficomila curtivena* Bouček, spec. nov.

Punctuation on head obliterate but on thorax often distinctly umbilicate, becoming relatively less dense and obliterate in smaller and pale-coloured specimens, usually absent on median part of scutellum in males. Scrobes deep but not carinate on margins, not reaching ocellus; interantennal ridge ending in abrupt angular tooth; antennal toruli slightly above middle of face. Clypeus delimited laterally by grooves reaching tentorial pits; lower margin bilobed. Malar groove distinct; gena posteriorly edged as in *Sycophila*; occiput with weak and low occipital fold (normally developed as carina running from upper margin of foramen obliquely towards mouth corners) only half way down, ending at change of plane. Female antenna 11153; scapus tapering apically; funicular segments short; male antenna 11143; first funicular segment the longest, constricted at base, longer than pedicel.

Pronotal collar on shoulders only bluntly edged, not carinate. Scutellum with axillulae indistinctly separated. Propodeum: median part flat or weakly concave, moderately finely reticulate in larger specimens, in smaller ones sculpture partly obliterate; median area anteriorly delimited by arcuate carina which broadly touches metanotal margin (as in some *Sycophila*, slightly less broadly than in *Systole* and *Bruchophagus*). Mesepimeron horizontally striate, separated from mesepisternum by fine carina; mesosternal shelf partly delimited: sublaterally by short cross-carina as continuation of epicnemial edge (weak in some males) and in middle by a rounded or slightly depressed (but still very distinct) projection which is hollowed from both sides into a shape of a little elongate window (fig. 137), similar to that of *Syceurytoma* (fig. 138). Fore wing with short marginal vein widening distally, stigmal vein curved on its upper margin and longer than short postmarginal vein.

Gaster of female very nearly sessile (petiole barely visible dorsally), about as long as thorax, convex or compressed; fourth tergite much longer (*F. curtivena*) or hardly longer (*F. gambiensis*) than the third; epipygium short. In male petiole longer than hind coxa.

Comments. — This is another peculiar group, in some ways again intermediate between *Eurytoma* and *Sycophila*. Although at present *Eurytoma* includes a whole range of sometimes very different species-groups, they all differ from *Ficomila* at least in the venation, especially in the postmarginal vein, which is always relatively longer, and also in the occipital characters. By the genae, scrobes and the venation *Ficomila* approaches more *Sycophila*, but in that genus, although its limits were slightly extended recently (Bouček, 1974: 267—268), the mesosternal region of the thorax is remarkably uniformly shaped, without any separation of the “mesosternal shelf”, in contrast to *Ficomila*, as stressed in the key above.

The genus is represented in the material by two species: of these the type-species *F. curtivena* is known only in the females, the other, which I identify as *F. gambiensis* (Risbec), in both sexes. Because of certain doubts as to the identity of the latter species I designate the first as type-species.

***Ficomila curtivena* Bouček, spec. nov.**
(figs. 135—137)

Female. —1.7—2.5 mm. Black, but often with mouth margin, pronotum lateroanteriorly and subalar sclerite testaceous, sometimes pale brown spreads on lower face, eye orbits and most of pronotum, with vague spots even on sides of mesoscutum and base of gaster; legs and antennae mainly pale coloured or with parts infusate, beginning with coxae, then more or less femora and flagellum. Wings hyaline to whitish, veins yellowish.

Head with inner eye orbits converging upwards; a few hairs present between scrobes and ocellus. Relative measurements: breadth of head 92, length 51, height 72, frontovertex 51, POL 23, OOL 8, eye 43×38, malar space 27, scapus 34, flagellum plus pedicellus 80. Funicular segments 2 to 5 moderately transverse, each slightly shorter than pedicellus; first funicular segment swollen dorsally, about 1.4 times as long as broad.

Thoracic dorsum sculptured and about 1.57 (less than 1.6) times as long as broad; pronotum barely narrower than mesoscutum, relative length laterally 33 (compare head). Propodeal, upper diverging cross-carina ending by angular tooth sublaterally (there turning downwards); area anterior to carina subdivided by several longitudinal carinulae; in profile propodeum sloping at about 70° as to plane mesoscutum-scutellum. Fore and hind femora moderately thickened; hind tibia with a dorsal row of about 9 outstanding bristles, longest bristle about as long as 0.8 of tibial breadth. For fore wing venation see fig. 135.

Gaster (fig. 136) smooth; slightly compressed from sides, dorsum only weakly convex; fourth tergite about twice as long as the third, bearing one cross-line of hairs which is broadly interrupted dorsally. Apex slightly up-turned.

Male. — Not known (one male which might belong to this species, cannot be at present separated reliably from those of *F. gambiensis*).

Type material. — Holotype ♀, Zimbabwe-Rhodesia: Chishawasha nr. Salisbury, ex *F. burkei* (*natalensis*), 26.xi.1974 (A. Watsham); in BMNH, London. Paratypes: same origin as holotype, 22 ♀, xi.-xii.1974, iii. and ix.1976, iii.1977; Makumbi Mission nr. Salisbury, 4 ♀, iv.1975 and xii.1976 (all A. Watsham). South West Africa: Gross Otavi, ex *F. petersii*, 4 ♀, xi.1973 (A. Watsham). Paratypes deposited in RMNH, Leiden and in the Watsham collection.

***Ficomila gambiensis* (Risbec) comb. nov.**

(figs. 131—134)

Decatoma gambiense Risbec, 1955b: 561—564. Holotype ♀, Gambia. Mocquerys (MNHN, Paris) [examined].

Female. — 2.1—3.2 mm, holotype 4 mm. Usually honey yellow, flagellum and gaster slightly darker, tiny dark spots at ocelli; in holotype thorax except pronotum and almost whole gaster dark, blackish, in dark-coloured southern specimens whole body with all coxae almost black, only sides of pronotum and base of gaster ventrally paler, femora partly infusate. Fore wing always with distinct macula, normally small, but somewhat expanded below level of stigmal vein in holotype.

Head dorsally about 1.8 times (1.75—1.85×) as broad as long, with only slightly receding temples, hence appearing rather quadrangular. Scrobes ending one diameter from ocellus. Antenna: flagellum plus pedicellus less than 1.1 times as long as breadth of head; pedicellus nearly as broad as the broad-filiform funicle and distinctly shorter than its first segment (fig. 132) which is as if swollen on dorsal side and slightly concave ventrally where short hairs replace longitudinal sensilla; this segment about twice as long as broad in large holotype but usually relatively shorter in smaller specimens.

Thorax about 1.75 times as long as broad. Pronotum shallowly emarginate posteriorly. Outline of propodeum in profile straight; neck distinct. Marginal vein of fore wing slightly more widening (fig. 131) than in *F. curtivena* (fig. 135).

Gastral body slightly longer than thorax (fig. 133), fairly strongly compressed from sides, but dorsal keel rather blunt; hypopygium reaching about one-quarter along convex ventral edge.

Male. — Size and colour range about as in female (except holotype). Scapus distinctly broadened in basal two-thirds (fig. 134); pedicellus much shorter than first funicular segment which is dorsally swollen and bears short hairs in subconcave basal part ventrally, similar to female. Fore wing strongly hairy in basal part, unlike in female, marginal vein moderately to very strongly thickened. Petiole dorsally slightly shorter than scutellum, narrowed anteriorly, about 3.5 times as long as broad.

Material (apart from holotype). — Gambia: Fajara, 2 ♀, i.1978 (L. Huggert). Uganda: Kawanda, ex *Ficus sycomorus*, 1 ♀, ii.1939 (T. H. C. Taylor). Zimbabwe-Rhodesia: Chishawasha and Makumbi Mission nr. Salisbury, mostly ex or on *F. burkei*, 50 ♀ and 23 ♂, 1970—1977 (A. Watsham). South West Africa: Gross Otavi, ex *F. petersii*, 3 ♀, 6 ♂, xi.1973 (A. Watsham). South Africa: Hartbeeste Poort Dam, 1 ♀, viii.1974 (A. Watsham).

Comments. — This is apparently a widespread African species which I hope I have correctly interpreted, although in the wide variation of the specimens actually none is extremely similar to the holotype. However, the difference seems to be due mainly to the unusual size of the holotype.

Certainly of interest is the fact that this species was found associated with a least three different fig species, which again must reflect in some variation, apart from the geographical range from Gambia to Uganda and South Africa.

Sycophila Walker

Type-species: *Sycophila decatomoides* Walker.

The genus *Sycophila* Walker was earlier known under the name *Decatoma*, but this name given by Spinola was later recognised, according to its type-species, as a junior synonym of *Eurytoma* Illiger. *Decatoma* was then replaced by *Eudecatoma* Ashmead, until this name itself was synonymised, together with *Tineomyza* Rondani, under *Sycophila* (by Bouček, 1974). The synonymy slightly widened the earlier concept of the genus (earlier based only on North American and European species), mainly as to the length of the gastral petiole and the form of the expanded marginal vein. These characters vary considerably within the genus, especially in many tropical species partly or mostly associated with galled figs. Even now, however, *Sycophila* is one of the better delimited genera of the whole subfamily Eurytominae. It includes species of relatively usual eurytomid shape of body, with the gena posteriorly more or less edged but never sharply carinate; the scrobes deep, the parascrobal areas flat or slightly convex; antennae in female with five free funicular segments (11153), in male with four funicular segments (11143), without whorls of bristles. The marginal vein of fore wing is more or less widened (varying as to species and sometimes also as to sexes: more widened in males) and very nearly always bearing an infusate spot which sometimes extends below the vein. The propodeum has always a median depression which, especially if it is shallow, is anteriorly delimited by slightly oblique cross-carinae diverging from the middle of the base (anterior margin). Otherwise the gaster in the males is always petiolate, in the female the petiole is sometimes shortened. Legs usually normal, but in some species, especially in the males, mainly fore and hind femora are thickened, often strongly so.

The intraspecific variation, especially of size and colour, is frequently wide. Some species vary from completely yellow to completely black, but in the partly pale specimens a certain pattern can be recognised. The size affects also sculpture and density of pubescence. Some of the variation is certainly connected with temperature and humidity, some is more host-dependent or climatic and may offer a geographic pattern. Apparently at least some *Sycophila* are not host-specific and it seems that the host range of some species may be fairly wide.

List of described African and Malagasy species of *Sycophila*:

- Sycophila aethiopica* (Silvestri, 1915) comb. nov. (from *Decatoma*), Eritrea
- Sycophila cassinopsisi* (Risbec, 1952) comb. nov. (from *Decatoma*), Madagascar
- Sycophila hilla* Watsham (1977), Zimbabwe-Rhodesia
- Sycophila kestraneura* (Masi, 1917) comb. nov. (from *Decatoma*), Seychelles
- Sycophila nigrofasciata* (Risbec, 1952) comb. nov. (from *Decatoma*), Madagascar

Sycophila ruandensis (Risbec, 1957) comb. nov. (from *Decatoma*), Rwanda
Sycophila rubra (Risbec, 1952) comb. nov. (from *Decatoma*), Madagascar
Sycophila xiphigaster (Risbec, 1955c) comb. nov. (from *Decatoma*), Kenya

Dr. J. R. Steffan of the Paris Museum (MNHN) kindly enabled me to examine most of Risbec's species. One of them, *S. ruandensis*, is extremely close to *S. aethiopica*, of which I could examine a syntypic couple coming from Nefasit, Eritrea, thanks to Prof. Dr. G. Viggiani of Portici: the female is here designated (and was accordingly labelled by me) as lectotype. The two may be just forms of one species, the main difference being more compressed female gaster in *aethiopica*, apart from colour and extension of the sub-parastigmal patch of hairs, which is certainly prone to intraspecific variation. Also, *S. aethiopica* seems to be distributed over most parts of Africa. Most of these species are probably never associated with figs, only *S. kestraneura* apparently is, and probably also *S. xiphigaster*. The newly described species are compared with the old ones wherever it is relevant.

Decatoma plectroniae Risbec (1952) from Madagascar does not belong to *Sycophila*. It has a percurrent carina bordering the gena and temple posteriorly.

***Sycophila kestraneura* (Masi)**
(figs. 142, 143; pl. 4 fig. 5)

Decatoma kestraneura Masi, 1917: 138—139. Holotype ♀, Seychelles (BMNH, London) [examined].

This seems to be a very variable species and it took me a long time to recognise it from the small holotype specimen (in BMNH), a dwarf as I now believe, from the Seychelles Islands. A redescription seems necessary.

Female. — 2.1—3.0 mm. Usually yellow with poor blackish markings in median line of body, including ocellar area, occiput, median streak on thorax expanding on base of propodeum to inside of wing bases, petiole and dorsal keel of gaster. This pattern may be either reduced or slightly extended. Fore wing with elongate fuscous spot on swollen marginal vein, spot expanding slightly below the vein in large darker specimens.

Head dorsally about 1.85 times as broad as long; relative measurements: breadth of frontovertex 27.5, short oval eye 21×18 , malar space 13.5. Scrobes ending about half diameter from ocellus; interantennal keel narrow and not protruding, rather gradually sloping into scrobal cavity. Flagellum plus pedicellus barely longer than breadth of head, subclavate (fig. 142); pedicellus about 1.4 times as long as broad, narrower than basal funicular segments first of which is usually about 1.8 times as long as broad and distinctly longer than pedicellus (and bearing two rows of longitudinal sensilla), the fifth quadrate; clava about twice as long as broad.

Pronotum nearly as broad as mesoscutum, its sides in dorsal view moderately rounded. Umbilicate punctures on thorax usually fairly dense, but less so in smaller specimens. Axillar grooves anteriorly wide apart, only slightly inside of notauli: base of scutellum slightly broader than each axilla. Propodeum with conspicuous anterior converging keels, anterior to them (submedially) with

broad irregular areolae; median part shallowly convex, broad, anteriorly often with indication of median carina; posterior quarter, to one-third, narrowed, neck-like. Legs relatively slender, more slender than in *S. naso*. Fore wing pubescence rather reduced, dorsal surface basally extensively bare, occasionally with 1 or 2 hairs on basal fold; costal cell dorsally bare, on ventral surface generally with one row of hairs in proximal third, expanding to about 3 irregular rows distally; marginal vein distinctly longer than the subhyaline stigmal vein, swollen, its lower margin convex (fig. 143).

Petiole 1.5—1.8 times as long as broad (dorsally); gastral body fully as long as thorax, smooth, strongly compressed from sides, with distinct dorsal keel. Hypopygium ending shortly before middle of gastral body, its apex with usually two pairs of hairs.

Male. — 1.5—3.4 mm. Small specimens often similar to female in colour, but all differ mainly in antennae, fore wing pilosity and veins, and in gaster. Dark colour often spreads with larger size, including fore wing macula which may then be combined with brownish infumation of the blade proximad and distad of speculum; also femora get much stouter with larger size.

Scapus and pedicellus hardly different from female, but flagellum is filiform, itself (less pedicellus) distinctly longer than breadth of head; all funicular segments elongate, with rather dense subdecumbent hairs, first segment cylindrical, always much longer than pedicellus, in larger specimens fully twice so; following three segments subequal, each fully twice as long as broad; clava nearly four times as long as broad. Pronotum expanding forwards in larger specimens. Fore wing pilosity dense, long, extensive, especially long in basal part; in small specimens marginal swelling not much larger than in female but in larger specimens becoming more conspicuous, broader and further accentuated by expanding infuscation which may become higher than broad, as in pl. 4 fig. 5, which also shows the form of gaster, including the rather slender curved petiole which is slightly longer than the scutellum.

Material. — *S. kestraneura* was reared from figs of *Ficus burkei* in Zimbabwe-Rhodesia, from *F. petersii* in South West Africa (Gross Otavi, xi.1973, A. Watsham), from unidentified figs in Uganda (Kawanda, ii.1939, T. H. C. Taylor) and collected also in South Africa: Pondoland, Port St. Johns, v.1923 (R. E. Turner). In Zimbabwe-Rhodesia the collected or reared material comes from Chishawasha and Makumbi Mission nr. Salisbury and the Chinamora Reserve (all A. Watsham).

Comments. — In Africa there seems to be another species very close to *S. kestraneura* (Masi), with similarly shaped marginal vein but shorter funicular segments and the hypopygium (in female) fairly long. Otherwise *S. kestraneura*, among the African species, seems to be the one most closely related to the type-species of the genus *S. decatomoides* Walker from India.

***Sycophila punctum* Bouček, spec. nov.**
(figs. 144, 145)

Female. — 1.8—3.1 mm (holotype 2.5 mm). Usually predominantly black,

with pronotum on shoulders broadly pale yellow, also antennae pale yellow; hind coxa, femur and tibia mainly infusate, on mid and especially fore legs pale colour more extended; sometimes head yellowish, mainly ventrally, rarely also most of pronotum, legs and even parts of ventral thorax and gaster anteriorly pale. Wings hyaline, with fuscous spot small and usually round, not reaching pale base of marginal vein.

Head finely reticulate, without umbilicate punctures; white pubescence unusually short, subdecumbent, longer and more erect only at mouth margin. In dorsal view head about 1.6–1.68 times as broad as long, with lateral ocellus nearer to eye than to median ocellus; the latter fully by its diameter from scrobes; interantennal crest not high but slightly tooth-like. Relative measurements: head width 47, length 28.5, height 37, frontovertex 25.5, eye 23×19 , malar space 12, scapus 19, flagellum plus pedicellus 46. Centres of antennal toruli on lower ocular line. Pedicellus 1.7–1.8 times as long as broad, at least slightly longer (but not broader) than first funicular segment which is usually 1.5 times as long as broad. Flagellar segments stout-filiform, preclaval one often quadrate; flagellar pubescence subdecumbent.

Sculpture on thorax fine dense reticulation, surface not shiny; puncturation obliterated, pubescence white, short and almost decumbent, absent from central area of scutellum. Anterior edge of lateral panel of pronotum usually finely carinate. Propodeal surface in profile convex in upper one-third. Hind tibia with a row usually of 7–10 dorsal bristles, middle ones longer than half breadth of tibia. Fore wing with basal third bare (as in *kestraneura*); marginal vein gradually expanding, relatively short, about as long as the stigmal (fig. 145).

Gastral petiole dorsally (measured as usual from anterior cross-ridge) subquadrate. Body of gaster about as long as thorax less propodeum, distinctly compressed, tergites 3 to 5 distinctly keeled, fourth slightly longer than third and with one short row of sparse hairs on either side; tergites with extremely fine and shallow cross-striae.

Male. — 1.9–2.5 mm. Head extensively to completely yellowish; pronotum dorsally yellow, except median triangle, but lower part of lateral panel abruptly black, often other parts of thorax pale. Head very stout (fig. 144), but variable, 1.35–1.55 times as broad as long in dorsal view. Antennal toruli entirely below lower ocular line. Pronotum distinctly longer than in ♀, its collar fairly flat, about 1.5 times as broad as laterally long. Fore and hind femora distinctly thickened. Fore wing macula in one specimen extended down as curved streak. Gastral petiole stout in lateral view, dorsally finely reticulate and about 2.1 times as long as broad, slightly tapering forwards.

Type material. — Holotype ♀ (plus 7 ♀ and 1 ♂ paratypes), Zimbabwe-Rhodesia: Makumbi Mission nr. Salisbury, ex *F. burkei*, iv.1975; then 6 ♀ paratypes, xii.1976 (all A. Watsham); deposited in BMNH, London. Further paratypes: Chishawasha nr. Salisbury, 73 ♀ 2 ♂, 1969–1977, mostly ex *F. burkei*; St. Pauls Mission, 1 ♀, i.1975 (A. Watsham). Some paratypes are deposited in RMNH, Leiden and in the Watsham collection.

Comments. — *Sycophila punctum*, as stressed in the key, is recognisable mainly on its pilose prepectus (fig. 144), further in the female on the usually predominantly black colour with large pale spots on pronotal shoulders, small wing macula and a stout head. The head apparently becomes stouter in larger males, also the wing macula may be expanded. It is striking that so few males were reared or collected, although in this species they seem to be quite safely recognisable.

***Sycophila sessilis* Bouček, spec. nov.**
(figs. 146, 148, 149)

Female. — 2.0—2.7 mm. Colour as in paler specimens of *S. punctum*, i.e., with pale yellow shoulders but yellowish colour otherwise spread also over most parts of body, but flagellum slightly brownish.

Head dorsally slightly less than 1.8 times as broad as long. Interantennal ridge gradually descending into scrobal cavity. Relative measurements: head width 48, frontovertex 25, eye 19.5×17 (smaller than in *punctum*), malar space 13.5, scapus 20, flagellum plus pedicellus 51. All funicular segments elongate, the first very slightly longer than pedicel (fig. 149).

Umbilicate punctures on thorax shallow and not very dense, but fairly distinct, pubescence longer than in *S. punctum*. Exposed part of prepectus bare, occasionally with 1 or 2 hairs. Fore wing with sparse bristles on basal fold, rarely with only two or three; fuscous macula similar to that of *S. punctum* but marginal vein longer (fig. 146).

Gastral petiole dorsally much broader than long, gaster almost sessile; its body about as long as thorax, more strongly compressed than in *S. punctum*, surface smooth.

Male. — Not known.

Type material. — Holotype ♀, Zimbabwe-Rhodesia: Chishawasha nr. Salisbury, ix.1974 (A. Watsham); in BMNH, London. Paratypes: Chishawasha, partly ex *F. burkei*, 7 ♀, ix.1970, ix.—x. 1974, iii. and vii.1975, vi.1977 (A. Watsham); South Africa: Pondoland, Port St. Johns, 1 ♀, ii.1924 (R. E. Turner).

Comments. — The species should be recognisable from the key and the additional characters in the description. However, I could not find any males which I could safely associate with the females of *S. sessilis*.

***Sycophila modesta* Bouček, spec. nov.**
(fig. 147)

Female. — 2.2—2.6 mm. Predominantly yellow, with tiny dark spots at ocelli and brown colour on flagellum, pedicellus, median part of propodeum, petiole, broad bands at hind margins of first three tergites, sides of fourth tergite and apical half of hind tibia. Dark markings may be slightly reduced or expanded.

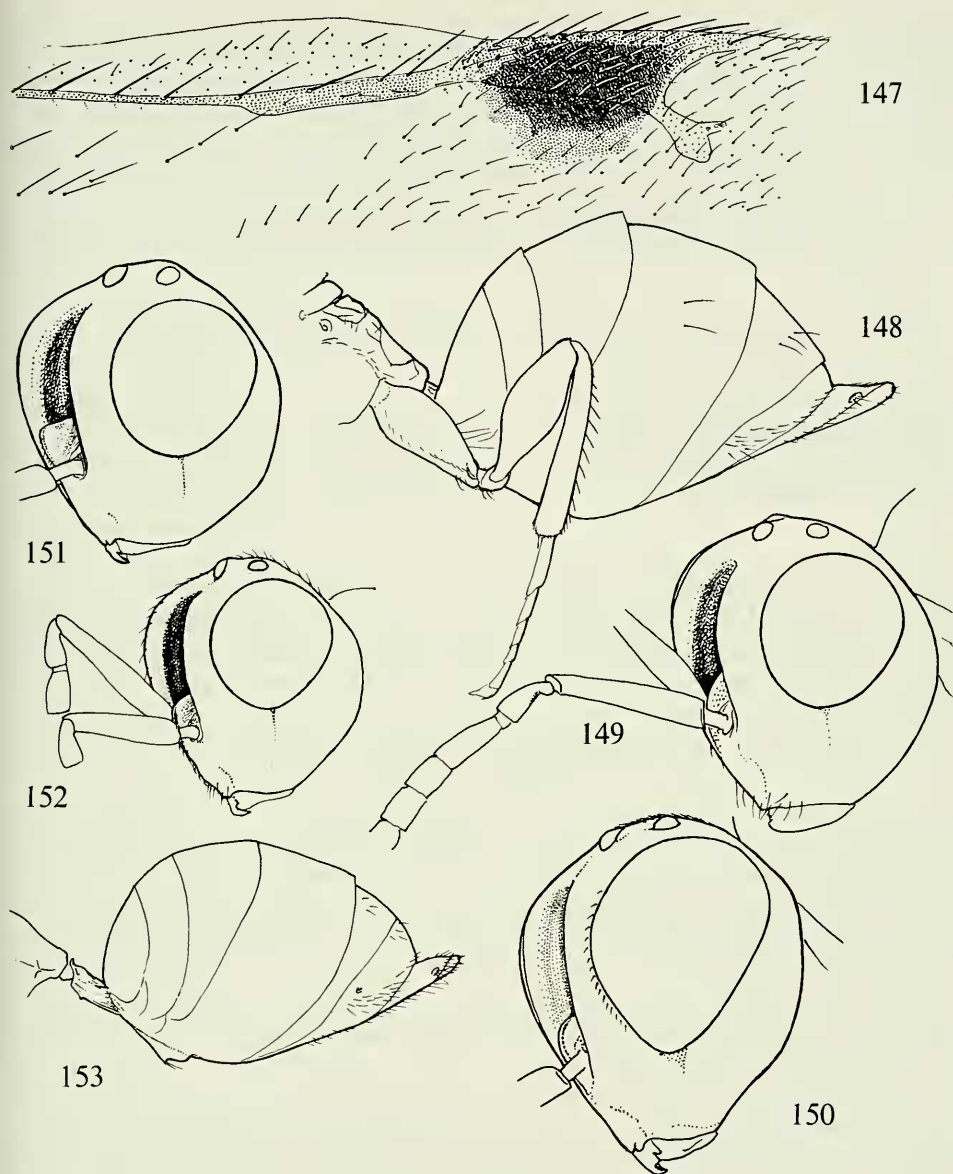


Fig. 147. *Sycophila modesta* Bouček, spec. nov., venation of female fore wing. Figs. 148, 149. *Sycophila sessilis* Bouček, spec. nov., female. 148, propodeum, gaster and hind leg; 149, head, tilted lateral view. Fig. 150. *Sycophila flaviclava* Bouček, spec. nov., female head in tilted lateral view. Figs. 151–153. *Sycophila naso* Bouček, spec. nov., female. 151, head in a larger specimen with a more rectangular interantennal lobe; 152, head in a smaller specimen with more rounded interantennal lobe; 153, gaster.

Wing macula (fig. 147) as in *S. naso*.

In colour, size, sculpture, pubescence of fore wing and length of petiole very similar to *S. naso*, but for following characters. Lateral ocellus slightly nearer to

eye than to median ocellus, interantennal ridge only gradually sloping into scrobes; pedicellus up to 2.2 times as long as broad, subequal in length to first funicular segment; scutellum slightly broader at base (border with mesoscutum); propodeum rather flat in median part, ground nearly smooth, wide-areolate, with stronger carinae delimiting a pentagonal area, with a cross-carina separating the neck; costal cell dorsally in distal half usually with distinct line of erect hairs (fig. 147; rarely reduced to several hairs only). Body of gaster broader and shorter, only moderately compressed from sides, not distinctly keeled dorsally.

Male. — Not known (I am not sure about their specific identity).

Type material. — Holotype ♀ (plus 1 ♀ paratype), Zimbabwe-Rhodesia: Makumbi Mission nr. Salisbury, ex *F. burkei*, xii.1976 (A. Watsham); in BMNH, London. Further paratypes: Chishawasha nr. Salisbury, mostly ex *F. burkei*, 12 ♀, ix. and xi.1974, iii. and vi.1975, xii.1976, vi.1977 (A. Watsham).

Comments. — This species seems to be safely recognisable in the females, although similarly coloured females of other closely related species, e.g., of *S. naso*, may occur. The wing pilosity seems to be a good character, but not for the males in which larger and darker specimens of the same species often exhibit much greater density of pubescence, along with broader veins, femora, etc.

***Sycophila naso* Bouček, spec. nov.**
(figs. 151—153)

Female. — 2.3—3.5 mm (holotype 2.8 mm). Body usually yellow (as in holotype) but colour variable: dark colour appearing first in a streak on dorsal keel of gaster, then at ocelli, on lower occiput, pronotal collum, on deeper parts inside wings, some specimens have also darker mesoscutum anteriorly and scutellum posteriorly, in extreme case whole gaster and underside of thorax including propodeum are dark, also partly mid and hind legs; flagellum brownish; fore wing with dark elongate spot on marginal vein, with about half of macula (or more) below the vein.

Puncturation, especially on thorax, rather dense and conspicuous; pubescence moderately short but distinct. Head dorsally about 1.75 times as broad as long, with temples rather strongly receding; POL nearly twice OOL; lateral ocellus hardly nearer to median one than to eye; scrobes ending by blunt edge about half diameter before ocellus; interantennal keel high, fairly broad ventrally, dorsally forming a distinctly protruding subrectangular tooth (figs. 151, 152; hence the name, *naso* = nose). Parascrobal area subequal in breadth to scrobes at level where its straight edge turns towards ocellus. Pedicellus dorsally fully twice as long as broad (17 : 7), slightly to obviously longer than first funicular segment (17 : 15 in holotype), its dorsal side nearly straight; fifth funicular segment slightly elongate; clava about 2.5 times as long as broad.

Thorax about twice as long as broad (mesoscutum); pronotum slightly widening forwards, with subrectangular protruding corners, laterally longer than in

middle; lateral panel not distinctly carinate anteriorly. Mid lobe of mesoscutum posteriorly narrow, scutellum still more narrowed anteriorly, axillae little apart. Propodeum shorter than scutellum (about 3 : 4); its median depression shallow; anterior diverging keel distinct, pentagonal median area subdivided into irregular areolae. Metasternal region medially usually with three distinct carinae converging caudad into one. Legs fairly slender. Fore wing with distinct line of bristles on basal and most of cubital fold, usually also some bristles on basal cell (as in fig. 147); costal cell with numerous short hairs on ventral surface but dorsal surface bare, occasionally with one hair; marginal vein broadening distad, its lower margin almost straight.

Gastral petiole dorsally fully 1.5 times as long as medially broad (20 : 13 in holotype), sides subparallel. Gastral body (fig. 153) slightly longer than thorax (including propodeum), fairly strongly compressed from sides, dorsally with blunt but distinct keel; epipygium very shortly protruding, usually also tips of sheaths visible; tergites 1 to 5 virtually bare and smooth. Hypopygium (not always visible) rarely exceeding basal quarter of gaster, at apex with two thin long bristles, before them a pair of shorter hairs.

Male. — In size and colour and in most characters very similar to female. Pedicellus dorsally about 3 times as long as broad, almost as long as, to slightly longer than, first funicular segment (anellus excluded), latter slightly longer than any of following three subequal segments; flagellum almost filiform, clava as long as two preceding segments combined. Basal third of fore wing with many more hairs than in female, hairs much denser in bigger and darker specimens; ventral surface of costal cell with extremely dense short pubescence, distal half of dorsal surface with a row of hairs which is usually partly doubled. Lower margin of marginal vein almost straight (but looking slightly convex in certain lights in darker specimens), relatively longer than in *S. kestraneura*, about twice as long as the pale stigmal vein which is subparallel to front margin of wing; greater part of fuscous macula often below the vein. Petiole dorsally slightly shorter than scutellum.

Type material. — Holotype ♀, Zimbabwe-Rhodesia: Chishawasha nr. Salisbury, ex galls on *F. burkei*, v.1975 (A. Watsham); deposited in BMNH. Paratypes: same origin as holotype, 65 ♀ and 52 ♂, ix.—xii.1974, ii., v.—xi.1975, ii.—iii.1976, i.1977; Makumbi Mission nr. Salisbury, 1 ♀, iv.1975 (all A. Watsham); Uganda: Kampala, ex galls on stem of *Ficus sycomorus*, 2 ♀, 8.x.1935 (T. H. C. Taylor); South West Africa: Gross Otavi, ex *F. petersii*, 1 ♀, xi.1973 (A. Watsham). The females of the Chishawasha material emerged between May and July are yellow-coloured, those emerged between September and March are dark-coloured, whilst the dark males appear throughout the year, although the yellow ones only together with yellow females. Some paratypes in RMNH, Leiden and the Watsham collection.

Variation. — Apart from the range of variation already mentioned I find some puzzling features in some further specimens (not included in the type material of *naso*). In a few females the pedicellus is relatively shorter (fig. 152) and so it is in a

number of males. I wonder whether still another species may be involved, but as to the males, some of them may belong also to *Sycophila sessilis* or *S. modesta*, whose males are not yet known for sure.

Comments. — *S. naso* is recognisable mainly on the relatively long and slender pedicel (in both sexes), the strongly converging axillar grooves and the small wing macula on the straight lower margin of the marginal vein. Furthermore the female has a fairly long gastral petiole and hairy proximal part of the fore wing, but virtually no hairs on the dorsal surface of the costal cell.

Another similar species is *Sycophila cassinopsisi* (Risbec), comb. nov. originally described in *Decatoma* (Risbec, 1952: 278—281) from Madagascar. Dr. J. R. Steffan from the MNHN, Paris, kindly sent me the type material for examination. I remounted most of the syntypes on cards and designated one female (emerged 6.iv.1950) as lectotype and labelled accordingly. *S. cassinopsisi* is smaller but less slender than *S. naso*, has the puncturation on thorax much more obliterated, the head is stouter, about 1.5 times as broad as long (dorsally 70 : 47), the sides of pronotum are parallel, the collar is regularly convex, in middle almost as long as at sides, the pedicellus is distinctly broader than the proximal half of flagellum and much longer than the first funicular segment. The fore wing pubescence is short and rather reduced towards base, with only few hairs on basal fold. The gastral body of female is relatively short (not the petiole) and not keeled dorsally. By the stouter head it reminds one somewhat of *Sycophila punctum*, but that species differs greatly in colour, the pilose prepectus, the shorter marginal vein and petiole, etc.

***Sycophila flaviclava* Bouček, spec. nov.**

(fig. 150; pl. 4 figs. 3, 4)

Female. — 2.0—3.2 mm (holotype 3.2 mm). Predominantly yellow, with small black spots at occipital foramen, base of fore coxa, mid part of prepectus (normally concealed), a T-shape pattern on propodeum, metasternum and petiole; sometimes dark colour more spread, or less so (pl. 4 fig. 3); flagellum slightly infusate but most of clava (except base) yellow (hence the name).

Head shaped about as in *S. naso* but white pubescence distinctly denser, shorter and more decumbent (this to lesser extent also on thorax); lateral ocelli slightly nearer to eye than to median ocellus; eye distinctly larger than in *S. naso* and its lower extremity distinctly subangular; parascrobal areas relatively narrower, also temples and genae; interantennal crest descending slightly obliquely into scrobes; antenna very slightly clavate, pedicellus dorsally only 1.75 times as long as broad and slightly shorter (7 : 8 in holotype) than first funicular segment. Relative measurements: head breadth 54, length 30, height (with clypeal lobes) 45, frontovertex breadth 29, eye 29×21.5 , malar space 14, scapus 24, flagellum plus pedicellus 52.

Thorax slightly more robust than in *S. naso*; median part of metasternum in profile angular at level of anterior edges of hind coxae; metanotal hairline dense.

Gastral body distinctly less compressed than in *S. naso*, slightly shorter than thorax less propodeum; dorsally not keeled.

Male. — 2.7 mm. Colour (pl. 4 fig. 4) about as in holotype ♀ but flagellum not paler apically, pubescence slightly longer and more erect. Longest eye diameter in ratio to malar space as 23 : 13; pedicel dorsally twice as long as broad, scarcely longer than fourth funicular segment. Pronotum posteriorly hardly emarginate, this margin subparallel to anterior edge of collar; black petiole dorsally fully three times (28 : 9) as long as broad.

Type material. — Holotype ♀, Zimbabwe-Rhodesia: Chishawasha nr. Salisbury, ii.1977 (A. Watsham); in BMNH, London. Paratypes: same origin as holotype, partly reared from *F. burkei* galled figs, 9 ♀, 1 ♂, ix.—xi.1974, iii. and v.1975 and (1 ♀ + 1 ♂) iii.1976; Makumbi Mission nr. Salisbury, 1 ♀, xii.1976 (A. Watsham).

Comments. — The description is based on difference between *S. flaviclava* and *S. naso*. Both species belong to a group of closely related species which might be called the *naso*-subgroup and includes also *S. modesta* and *S. sessilis*, whilst the other two species treated here in detail, *S. punctum* and *S. kestraneura*, belong to other subgroups.

ORMYRINAE

Ormyrus Westwood

Type-species: *Ormyrus punctiger* Westwood; by monotypy.

The species of this group possess a strongly sclerotised gaster, often bearing characteristic rough sculpture (figs. 155—157). This sculpture (although not present in all species) combined with the obliterated notaular grooves and the virtually non-exserted ovipositor with which again a reduction of the epipygial cerci (to low tubercles) is correlated, were regarded recently as important enough to warrant the group a family status, i.e., independent of Torymidae. Riek (1970: 921) even transferred them, on the basis of the reduced cerci, as a subfamily to the Pteromalidae. However, an analysis of various critical characters seems to demonstrate strong links with Torymidae and thus they seem to be best placed as their subfamily, as they were mostly in the past.

Several generic names have been proposed in this group, all based on the number of the reduced proximal segments of the flagellum (anelli) and partly on the gastral sculpture. As they do not denote any evidently natural groups, only one genus is recognised, *Ormyrus* Westwood.

All *Ormyrus* species have associations with plant tissues, especially galls, although a few species probably develop in grass stems. Their actual role within the galls is not yet known, although they are supposed to be at least partly entomophagous, parasitic, rather than feeding solely on plant tissues (see under *O. flavipes*, below).

Three species were found in association with the galled figs of *Ficus burkei*: *Ormyrus watshami* spec. nov., *O. subconicus* spec. nov. and *O. flavipes* spec. nov. Otherwise the following species have been described from Africa south of the Sahara and from Malagasy:

- O. australis* Risbec, 1957, from Madagascar
O. chevalieri (Risbec, 1955 b) comb. nov. (originally in *Monobaesus*), from Chad
O. decaryi (Risbec, 1955 a) comb. nov. (originally in *Tribaeus*), from Madagascar, but widely distributed in southern Africa including Zimbabwe-Rhodesia
O. eugeniae Risbec, 1955 a, from Madagascar
O. harongae (Risbec, 1952) from Madagascar, originally described in *Wania*, but transferred to *Ormyrus* by Risbec (1955a: 176) himself
O. ornatus (Risbec, 1951) from Senegal, originally described in *Wania*, but transferred to *Ormyrus* by Risbec (1954: 535)
O. sculptilis Crosby, 1909, from Malawi (formerly Nyasaland)
O. striatus Cameron, 1907, from South Africa (the single extant male type in BMNH, London, Type Hym. 5—64, is here designated lectotype).

The new species are compared with the earlier described species following a study of their types.

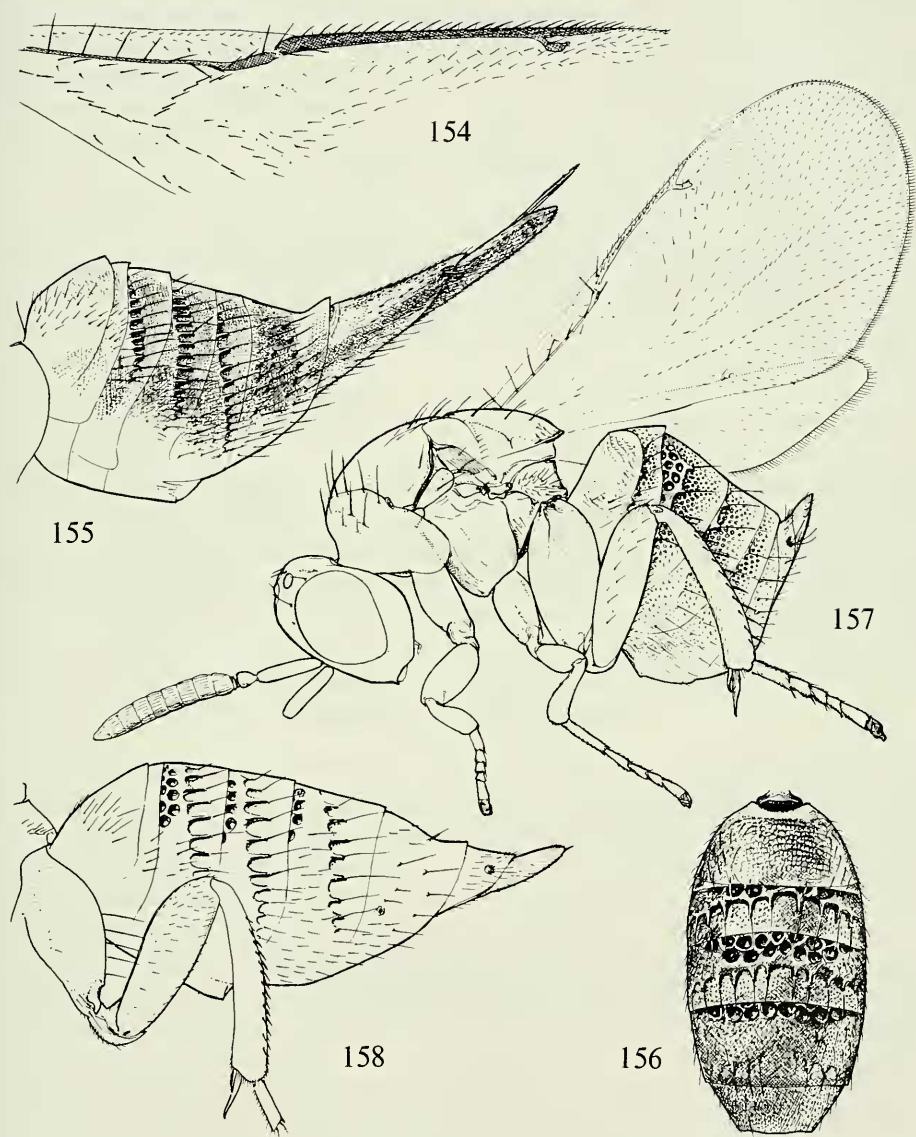
***Ormyrus watshami* Bouček, spec. nov.**
(fig. 157)

Female. — 1.7—2.0 mm. Bright metallic blue (mainly thorax) to green (vertex, occiput), dorsum of darker bluish gaster from apex of tergite 1 to base of tergite 3 black; antennae dark brown but scapes, fore tibiae, all tarsi, partly also knees, trochanters, mid tibiae and fore femora, testaceous. Wings hyaline.

Head fairly shiny, with sculpture weaker than in most known species of *Ormyrus*, on vertex consisting of curved engraved cross-striae; hairs on vertex reduced to one pair between posterior ocelli, two hairs at eye outside of posterior ocellus and one hair in front of this ocellus; piliferous punctures very conspicuous; parascrobal areas and lower face with very short and rather sparse white hairs. Anterior margin of clypeus short, bilobed, with median incision. Occipital carina situated low, near occipital foramen; a blunt edge slightly indicated not far behind posterior ocelli. Relative measurements: head width 85, height 67, length (thickness) 43, frons width 50, POL 24, OOL 8, eye 44×34 , malar space 16, scapus 28×7 , flagellum plus pedicellus 74. Pedicellus subglobose (beyond basal constriction); first anellus very thin, second larger but still more than 3 times as broad as long; all six funicular segments transverse, the first slightly so, the sixth twice as broad as long, each with one row of sensilla.

Thorax about 1.33 times as long as (mesoscutum) broad, strongly convex, shiny. Mesoscutum finely but not very densely cross-striate, mid lobe mainly bare, only posteriorly with 3—5 irregular pairs of bristles (fig. 157). Scutellum fully 1.1 times as long as broad, dorsally with concentric striae, with only 4 pairs of bristles leaving the disc broadly bare; apex of scutellar rim truncate-subemarginate and jutting out over the steep smooth propodeum; latter with numerous hairs on lateral callus. Mesopleuron almost smooth, bare; broad metapleuron with a few hairs. Dorsal edge of hind tibia with a row of about 10 strong bristles and more outside with another row of slightly shorter bristles; longer spur curved, its basal half distinctly hairy. Fore wing unusually sparsely pubescent, basal third including large speculum (which extends on dorsal surface to stigmal vein) bare, but usually with some hairs in place where basal fold approaches cubital fold.

Gaster not or hardly longer than thorax, fairly compressed from sides, with distinctly up-turned epipygium; tergites 2 to 5 with simple keel in median line. Hind margin of first tergite medially excised; second tergite short, punctured; third tergite longer, in basal half sublaterally with full 3 rows of coarse puncta (rows interrupted in median line), apex with simple puncturation (as most tergites); fourth tergite sublaterally hardly showing any puncta (they are mostly



Figs. 154—156. *Ormyrus flavipes* Bouček, spec. nov., female (154, 155) and male (156). 154, venation of fore wing; 155, gaster; 156, male gaster, dorsal aspect. Fig. 157. *Ormyrus watshami* Bouček, spec. nov., female. Fig. 158. *Ormyrus subconicus* Bouček, spec. nov., female gaster with hind leg.

concealed by third tergite). Hypopygium not prominent, not exceeding middle of gaster.

Male. — 1.6—1.9 mm. Bright brassy green but sides of thorax including tegulae testaceous, as well as all legs and antennal scapes; rest of antenna more brownish; usually also a broad indefinite cross-band on gaster just before middle testaceous.

Head and thorax very much as in female but anelli more conspicuous; fore wing pilosity denser and more conspicuous, speculum slightly reduced, reaching only two-thirds of marginal vein. Gaster flat, elongate, its sculpture generally weaker than in ♀; third and fourth tergites basally with large puncta (pits) arranged in very irregular rows, more than two of which are usually exposed on the third, and less than two rows on the fourth tergite.

Type material. — Holotype ♀, Zimbabwe-Rhodesia: Makumbi Mission nr. Salisbury, ex *Ficus burkei* galls, xii.1976 (A. Watsham); deposited in BMNH, London. Paratypes: 18 ♀ and 25 ♂, same data as holotype; 5 ♀ and 3 ♂, Chishawasha nr. Salisbury, x. and xii.1974, iii. and v.1975, iii. and ix.1976, vi. and x.1977.

Comments. — *Ormyrus watshami* can be immediately recognised in both sexes by the reduced pilosity on the dorsum of the head and thorax, leaving the mid lobe of mesoscutum bare, except for a few hairs posteriorly. This is unique among all other known species of the genus. In addition, the female has a characteristic short form of the gaster (fig. 157) and the male is distinct by the combination of the gastral sculpture and the widespread pale colour of the body. Otherwise it belongs to the *punctiger*-group.

***Ormyrus flavipes* Bouček, spec. nov.**
(figs. 154—156; pl. 4 fig. 6)

Female. — 2.1—4.3 mm (holotype 4.1 mm). Bright metallic green, partly more golden, especially on genae and sides of pronotum, but on hinder part of thorax and its sides more bluish to violaceous; violaceous mainly on dorsal edge of hind coxa, on dorsal part of first tergite and on the coarsely sculptured basal parts of tergites 3 to 5; epipygium dark purpureous; testaceous are: antennal scapes, all legs including fore coxae and distal parts of mid and hind coxae, then tegula with subalar area, partly lateral panel of pronotum and underside of gaster from where the pale colour usually spreads broadly dorsad, at least along hind margins of tergites, especially the fifth and sixth; rest of antenna black. Wings hyaline.

Head and thorax dorsally fairly dull, generally cross-striate, rather densely clothed with subdecumbent pubescence. Piliiferous punctures on vertex little conspicuous in dense cross-striation; an edge behind ocelli; occipital carina situated close to foramen. Face, except for the rather deep and smooth scrobes, with dense rugose striation; on lower face a slightly raised semicircular carina in half distance between toruli and mouth (separating also clypeus from supracly-

peal area), at sides ascending towards eye margins. Gena in a strip just behind malar groove very finely but distinctly striate; posteriorly striation much coarser. Lobes of clypeal margin low, separated by shallow emargination. Relative measurements: head width 111, height 83, length (thickness) 52, frons width 60, POL 24, OOL 12, eye 55×44 , malar space 24, distance between toruli and mouth margin 31, scapus 33×10 , flagellum plus pedicellus 101. Pedicellus dorsally nearly twice as long as broad (13 : 7); first anellus thin, second nearly half as long as broad; first funicular segment about 1.1 times, last (sixth) about 1.5 times as broad as long, each with dense row of sensilla; clava only 1.7 times as long as broad.

Thorax dorsally about 1.45 times as long as broad; its sculpture on mesoscutum consisting of cross-striation formed by numerous fine strips with mostly raised hind margins, with hairs arising on hind slope of raised margin. Scutellum about 1.15 times as long as broad, its apex rounded; anteriorly it is cross-striated with piliferous punctures, posteriorly striae are arranged concentrically. Propodeum subvertical, short, medially smooth, submedially alutaceous. Hind tibia dorsally with many rather short bristles which are only partly arranged in about three irregular rows. Fore wing with rather dense pilosity, cubital hairline reaching base of wing, basal hairline complete, basal cell with a dorsal row of bristles subparallel to submarginal vein; costal cell dorsally bare but ventrally with a hairline which is trebbled in distal third; stigma close and subparallel to postmarginal vein (fig. 154).

Gaster fully twice as long as thorax, fairly compressed from sides, with simple median keel distinct from tergite 4 to saddle of tergite 6 (fig. 155); distal third of gaster conical and moderately up-turned; tergites 3 to 5 each punctured, with basal part raised and ending by a vertical row of short ridges (each ridge with a bristle at caudal tip), virtually without any exposed foveae; on sixth tergite the ridges shortened into tubercles and additional weaker tubercles are scattered on basal part; ridges on fourth tergite mostly longer than distance between them. Sculpture as well as dimensions indicated in fig. 156.

Male. — 1.4–2.4 mm. Gaster wholly metallic, long oval (fig. 156), slightly longer than thorax to as long as head plus thorax combined; first tergite dorsally with broad-meshed reticulation; second very short; tergites 3 to 5 each with dark purple basal band of deep foveolae arranged in at least 2 rows, with smooth narrow interspaces.

Biology. — After finishing this paper one of us (A. W.) observed a white larva attached to the pupa of *Syceurytoma ficus* in a galled fig. He separated the parasitised pupa from the rest and after a few days the parasite pupated and proved to be *Ormyrus flavipes*.

Type material. — Holotype ♀, Zimbabwe-Rhodesia: Chishawasha nr. Salisbury, ex *F. burkei* galls, vi.1975 (A. Watsham); deposited in BMNH, London. Paratypes: 16 ♀, 12 ♂, same data as holotype; 12 ♀ and 20 ♂, same origin, ii.—ix.1975, 1 ♂ ix.1976; 1 ♂ Makumbi Mission nr. Salisbury, xii.1976 (A. Watsham).

Comments. — Among the African species known to me (described or undescribed) several species belong to a species-group of *O. orientalis* Walker characterised by the double carina on at least some gastral tergites in the females, with generally rough sculpture of gaster in both sexes. From the African species listed above *O. eugeniae* Risbec, *O. ornatus* (Risbec) and *O. striatus* Cameron belong to this *orientalis*-group and can be therefore easily separated from *O. flavipes*. Another easily separable species is *O. decaryi* (Risbec) belonging to the species with no dorsal keel on the gaster in females. Our *O. flavipes*, with its simple keel on the female gaster, belongs to the group of *O. punctiger* Westwood (a European species), along with the African *O. chevalieri* (Risbec) and *O. sculptilis* Crosby, and the Malagasy *O. harongae* (Risbec). *O. chevalieri* is easily recognisable by its short rounded female gaster. *O. harongae*, of which I examined the two syntypes (mounted on a slide) thanks to my colleagues from the Paris MNHN, differs from *O. flavipes* mainly by the predominantly yellowish body with the apical part of the female gaster still more produced and with shorter ridges in rows on the tergites. On the other hand *O. sculptilis*, of which I was enabled to examine and remount the original material (thanks to my colleagues in the Cornell University in Ithaca) and selected and labelled a female in good condition as lectotype (here designated), has the conical apical part of the female gaster much shorter than in *O. flavipes*, and not up-turned. The male can be more easily confused and the assessment of its diagnostic characters has to await a revision of the African species.

***Ormyrus subconicus* Bouček, spec. nov.**
(fig. 158)

Female. — 1.7—3.3 mm (holotype 2.5 mm). Mainly bright green, sometimes slightly bronze or brassy, but on head and thorax often in places bluish to violaceous or even purpureous, on gaster foveolate bases of middle tergites usually dark violet or purpureous; scapes (except apically), tegulae, trochanters, knees and tarsi testaceous, but often pale colour spreading to whole tibiae and most of femora, then with only hind femora mainly metallic. Wings hyaline.

Sculpture and form of head and thorax much as in smaller specimens of *O. flavipes*, but lateral ocelli slightly nearer to eyes, POL nearly 3 times OOL; scapus slender, about 4 times as long as broad.

Gaster (fig. 158) about 1.3 times as long as head plus thorax combined, only slightly compressed from sides, with simple dorsal keel. Basal part of tergites 3, 4 and 5 with distinct exposed belts of foveolae, usually in two rows on each tergite; tergite 6 usually as long as the fifth, its saddle very shallow; epipygium much shorter than preceding sixth tergite, not or scarcely up-turned.

Male. — 1.4 mm. Very similar to male of *O. flavipes* but hind femur distinctly infusate, antennal pedicellus subglobose, i.e., beyond its basal constriction only slightly longer than broad (more evidently so in *flavipes*) and tergites 4 and 5 each with full two rows of basal foveolae (irregular and not fully two rows in *flavipes*, fig. 156).

Type material. — Holotype ♀, Zimbabwe-Rhodesia: Makumbi Mission nr. Salisbury, *F. burkei*, xii.1976 (A. Watsham); in BMNH, London. Paratypes: 1 ♀, same data as holotype; 9 ♀ and 1 ♂, Chishawasha nr. Salisbury, *F. burkei*, xi.—xii.1974 (A. Watsham).

Comments. — This species also belongs to the *punctiger* species-group and, being close to *O. flavipes*, the above description stresses the diagnostic characters in relation to that species. This species-group is rich in species in Africa. Among the previously described species the nearest is *O. sculptilis* Crosby which differs from *O. subconicus* mainly in the still less saddled sixth tergite in the female, with longer fifth tergite exposing usually three regular rows of foveolae (in this it differs also from *O. flavipes*). I find these more extensive foveolate bands also in two males reared from figs of *F. petersii* in South West Africa and therefore regard them as probably specifically different from *O. subconicus*. It seems that as to the host-specificity possibly *O. watshami* is a typical fig-associated species, whilst *O. flavipes* and *O. subconicus* may develop also in some other galls or gall-like plant parts. However, the questions of the host-specificity have been hardly considered in the African chalcids so far.

REFERENCES

- Abdurahiman, U. C. & K. J. Joseph, 1967. Contributions to our knowledge of fig insects (Chalcidoidea: parasitic Hymenoptera) from India (New Series) 1. Notes on some new and interesting fig-insects. — *Oriental Insects* 1: 1—19.
- , 1975a. Three new Chalcidoidea (Hymenoptera) from India. — *Oriental Insects* 9: 99—109.
- , 1975b. New fig insects (Hymenoptera: Chalcidoidea) from India: three Torymids parasitic on Agaonids. — *Entomophaga* 20: 73—80.
- , 1976. Three new Torymidae (Hymenoptera: Chalcidoidea) from *Ficus arnottiana*. — *Oriental Insects* 10: 541—552.
- Bouček, Z., 1974. On the Chalcidoidea (Hymenoptera) described by C. Rondani. — *Redia* 55: 241—285.
- Brues, C. T., 1910. The parasitic Hymenoptera of the Tertiary of Florissant, Colorado. — *Bull. Mus. Comp. Zool. Harvard* 54: 3—125.
- Cameron, P., 1907. Description of species of parasitic Hymenoptera, chiefly in the collection of the South African Museum, Cape Town (Second paper). — *Ann. S. Afr. Mus.* 5: 203—225.
- Corner, E. J. H., 1965. Check-list of *Ficus* in Asia and Australasia with keys to identification. — *Gdns' Bull.*, Singapore 21: 1—186.
- Crosby, C. R., 1909. Chalcid-flies reared from galls from Zumbo, East Africa. — *Broteria (Zool.)* 9: 77—90.
- Galil, J., 1977. Fig biology. — *Endeavour (n.s.)* 1: 52—56.
- Galil, J. & J. W. Copland, 1981. *Odontofroggattia galili* Wiebes in Israel, a primary fig wasp of *Ficus microcarpa* L. with a unique ovipositor mechanism (Epichrysomallinae, Chalcidoidea). — *Proc. Kon. Ned. Akad. Wetensch. (C)* 84 (in press).
- Galil, J. & D. Eisikowitch, 1968. On the pollination ecology of *Ficus sycomorus* in East Africa. — *Ecology* 49: 259—269.
- Galil, J., M. Zeroni & D. Bar Shalom, 1973. Carbon dioxide and ethylene effects in the co-ordination between the pollinator *Blastophaga quadraticeps* and the syconium in *Ficus religiosa*. — *New Phytol.* 72: 1113—1127.
- Grandi, G., 1916. Gli Agaonini (Hymenoptera Chalcididae) raccolti nell'Africa occidentale dal Prof. F. Silvestri. — *Boll. Lab. Zool. Portici* 10: 121—286.
- , 1921. Recherche sul gen. *Philotrypesis* (Hymenoptera-Chalcididae). — *Boll. Lab. Zool. Portici* 15: 33—190.

- , 1922. Ricostruzione e morfologia comparata dei generi *Oritesella* Westw., *Sycobiella* Westw. ed affini (Hymenoptera-Chalcididae). — Boll. Lab. Zool. Portici 16: 1—58.
- , 1928. Revisione critica degli Agaonidi descritti da Gustavo Mayr e catalogo ragionato delle specie fino ad oggi descritte di tutto il mondo. — Boll. Lab. Ent. Bologna 1: 107—235.
- , 1930. Monografia del gen. *Philotrypesis* Först. — Boll. Lab. Ent. Bologna 3: 1—181.
- , 1955. Insetti dei fichi (Hymenoptera-Chalcididae) dell'Africa australe. — Boll. Lab. Ent. Bologna 21: 85—106.
- Hill, D. S., 1967. Figs (*Ficus* spp.) of Hong Kong. — Hong Kong Univ. Press, viii+ 154 p.
- Ishii, T., 1934. Fig chalcidoids of Japan. — Kontyû 8: 84—100.
- Joseph, K. J., 1953. Contributions to our knowledge of fig-insects (Chalcidoidea: parasitic Hymenoptera) from India iii. Description of three new genera and five new species of Sycophagini, with notes on biology, distribution and evolution. — Agra Univ. J. Res. 2: 53—82.
- , 1957. Do., vii. Description of fifteen new and revision of some old species. — Ann. Soc. Ent. France 125: 97—133.
- Joseph, K. J. & U. C. Abdurahiman, 1968. Description of six new species of *Decatoma* (Chalcidoidea: Eurytomidae) from *Ficus bengalensis* L. — Oriental Insects 2: 63—87.
- , 1969. Contributions to our knowledge of fig insects (Chalcidoidea: Hymenoptera) from India 4. Further descriptions of new fig insects from *Ficus bengalensis* L. — Oriental Insects 3: 37—45.
- Lachaise, D., 1977. Niche separation of African *Lissocephala* within the *Ficus* Drosophilid community. — Oecologia 31: 201—214.
- Martin, G. C., A. M. Owen & J. I. Way, 1973. Nematodes, figs and wasps. — J. Nemat. 5: 77—78.
- Masi, L., 1917. Chalcididae of the Seychelles Islands. — Novit. Zool. 24: 121—230.
- Mayr, G., 1885. Feigeninsecten. — Verh. zool.-bot. Ges. Wien (B) 35: 147—250.
- Newton, L. E. & A. Lomo, 1979. The pollination of *Ficus vogelii* in Ghana. — Bot. J. Linn. Soc. 78: 21—30.
- Palmer, Eve, 1977. A field guide to the trees of South Africa. — Collins, London & Johannesburg, 352 p.
- Peck, O., Z. Bouček & A. Hoffer, 1964. Keys to the Chalcidoidea of Czechoslovakia (Insecta: Hymenoptera). — Mem. Ent. Soc. Can. 34: 1—120.
- Poinar jr., G. O., 1979. *Parasitodiplogaster sycophilon* gen. n., sp. n. (Diplogasteridae: Nematoda), a parasite of *Elisabethiella stuckenbergi* (Agaonidae: Hymenoptera) in Rhodesia. — Proc. Kon. Ned. Akad. Wetensch. (C) 82: 375—381.
- Riek, E., 1970. Hymenoptera (Wasps, bees, ants). — In: CSIRO, The Insects of Australia. Melbourne Univ. Press, 1029 p.
- Risbec, J., 1951. Les Chalcidoïdes d'A.O.F. — Mem. Inst. franç. Afr. noire 13: 5—409.
- , 1952. Contribution à l'étude des Chalcidoidea de Madagascar. — Mém. Inst. Sci. Madagascar (E) 2: 1—448.
- , 1954. Chalcidoïdes et Proctotrupoides de l'Afrique occidentale française (3e Supplément). — Bull. Inst. franç. Afr. noire (A) 16: 524—552.
- , 1955a. Torymidae et Agaonidae de Madagascar (Hym. Chalcidoidea). — Ann. Soc. ent. France 124: 147—194.
- , 1955b. Chalcidoïdes et Proctotrupides Africaines. — Bull. Inst. franç. Afr. noire (A) 17: 533—580.
- , 1955c. Chalcidoïdes du Kenya (Mission de l'Omo). — Mem. Mus. natn. Hist. nat. (A) 8: 153—176.
- , 1957. Hyménoptères Proctotrupidae et Chalcidoïdes. — Mem. Inst. Sci. Madagascar (E) 8: 355—358.
- Silvestri, F., 1915. Contributo alla conoscenza degli insetti dell'olivo dell'Eritrea e dell'Africa meridionale. — Boll. Lab. Zool. Portici 9: 240—334.
- Subba Rao, B. R., 1978. New genera and species of Eurytomidae (Hymenoptera: Eurytomidae). — Proc. Indian. Acad. Sci. (B) 87: 293—319.
- Watsham, A., 1977. A new species of *Sycophila* Walker (Hymenoptera: Eurytomidae) from Rhodesia. — J. ent. Soc. sth. Afr. 40: 247—250.
- Westwood, J. O., 1883. Further descriptions of insects infesting figs. — Trans. ent. Soc. Lond.: 29—47.

- Wiebes, J. T., 1966a. The structure of the ovipositing organs as a tribal character in the Indo-Australian Sycophagine Torymidae (Hymenoptera, Chalcidoidea). — Zool. Meded., Leiden 41: 151—159.
- , 1966b. Provisional host catalogue of fig-wasps (Hymenoptera, Chalcidoidea). — Zool. Verh., Leiden 83: 1—44.
- , 1966c. Bornean fig wasps from *Ficus stupenda* Miquel (Hymenoptera, Chalcidoidea). — Tijdschr. Ent. 109: 163—192.
- , 1967. Redescription of Sycophaginae from Ceylon and India, with designation of lectotypes, and a world catalogue of the Otitesellini (Hymenoptera Chalcidoidea, Torymidae). — Tijdschr. Ent. 110: 399—442.
- , 1968. Fig wasps from Israeli *Ficus sycomorus* and related East African species (Hymenoptera, Chalcidoidea) 2. Agaonidae (concluded) and Sycophagini. — Zool. Meded., Leiden 42: 307—320.
- , 1969. *Philosycus*, a new genus of fig wasps allied to *Otitesella* Westwood (Hymenoptera Chalcidoidea, Torymidae). — Ann. Mus. R. Afr. centr., in 8, Zool. 175: 439—445.
- , 1971. A new record of *Allotriozonea prodigiosum* Grandi, and description of its symbionts (Hymenoptera, Chalcidoidea). — Mém. Inst. fond. Afr. noire 86: 367—383.
- , 1972. The genus *Alfonsiella* Waterston (Hymenoptera, Chalcidoidea, Agaonidae). — Zool. Meded., Leiden 47: 321—330.
- , 1974a. *Nigeriella*, a new genus of West African fig wasps allied to *Elisabethiella* Grandi (Hymenoptera Chalcidoidea, Agaonidae). — Zool. Meded., Leiden 48: 29—42.
- , 1974b. The fig wasps genus *Diaziella* Grandi (Hymenoptera Chalcidoidea, Torymidae Sycoecini). — Proc. Kon. Ned. Akad. Wetensch. (C) 77: 295—300.
- , 1974c. Species of *Agaon* Dalman and *Allotriozonea* Grandi from Africa and Malagasy (Hymenoptera Chalcidoidea, Agaonidae). — Zool. Meded., Leiden 48: 123—143.
- , 1974d. Philippine fig wasps i. Records and descriptions of Otitesellini (Hymenoptera Chalcidoidea, Torymidae). — Zool. Meded., Leiden 48: 145—161.
- , 1975. Fig insects from Aldabra (Hymenoptera, Chalcidoidea). — Zool. Meded., Leiden 49: 225—236.
- , 1977a. A short history of fig wasps research. — Gdns' Bull. Singapore 29: 207—232.
- , 1977b. Agaonid fig wasp from *Ficus salicifolia* Vahl and some related species of the genus *Platyscapa* Motschoulsky (Hym., Chalc.). — Neth. J. Zool. 27: 209—223.
- , 1978a. The genus *Kradibia* Saunders and an addition to *Ceratosolen* Mayr (Hymenoptera Chalcidoidea, Agaonidae). — Zool. Meded., Leiden 53: 165—184.
- , 1978b. Redescription of *Sycoscapter gibbus* Saunders, a parasitic fig wasp from Madagascar and Réunion (Hymenoptera, Chalcidoidea, Torymidae). — Ent. Ber., Amst. 38: 185—189.
- , 1979a. The fig wasp genus *Dolichoris* Hill (Hymenoptera Chalcidoidea, Agaonidae). — Proc. Kon. Ned. Akad. Wetensch. (C) 82: 181—196.
- , 1979b. Fig wasp from Gabon: new species of *Agaon* (Agaonidae) and *Phagoblastus* (Torymidae) (Hymenoptera Chalcidoidea). — Proc. Kon. Ned. Akad. Wetensch. (C) 82: 391—400.

INDEX OF GENERA AND SPECIES (MAINLY CHALCIDOIDEA)

- Aepocerus* 158
aethiopica 214
affinis 155
africana (*Otitesella*) 191
africana (*Philotrypesis*) 175
africanus (*Camarothorax*) 157, 194
alata 153, 157, 160, 162, [189]
Alfonsiella 156
Allotriozoon 156, 167, [169]
allotriozoonoides 167
Anastatus 153
anguliceps 155, 188
Apocrypta 156
appendiculatus 157
arabicus 157
Arachonia 156
aterrima 157
atrata 168, 169
australis (*Ormyrus*) 224
australis (*Sycoryctes*) 157
bakeri 157
bannensis 209
barbarus 152, 157, 160, [163, 170]
bethyloides 155, 194
bimaculata 157
Blastophaga 156
borneensis 156
braconidis 207
brevimucro 153, 157, 163, [203]
brevitarsis 157
brongersmai 152, 157, [160, 164, 168]
bruchocida 209
Bruchophagus 209, 211
caelebs 183
Callimomus 194
callosa (*Grasseiana*) 157
callosa (*Sycoryctes*) 157
caricae 153, 157
Camarothorax 156, 194, [197]
cassinopsisi 214, 222
Ceratosolen 155, 156
chevalieri 224, 228
coccothraustes 183
corneliae 156
cornutus 153, 157, 159, [164, 180]
cowani 157
crenulatus 155
Critogaster 158
Crossogaster 156, 169
curtivena 153, 157, 161, [212]
dagatiguyi 183
decaryi 224, 228
Decatoma 156, 214
decatomoides 156, 214, [216]
Desantisca 207
Dolichoris 156
Elisabethiella 156
enriquesi 164, 167
epicarioides 191
Epichrysomalla 158
equicollis 153, 157, 163, [197]
errata 156
erythraea 175
Eudecatoma 214
eugeniae 224, 228
Eujacobsonia 168
Eukoebelea 156
Eupelmus 153
Eupristina 156
Eurytoma 155, 156, 205, [208, 214]
ficcicola 157
Ficomila 156, 209, 211
ficus 153, 157, 161, 208, [209, 227]
ficusgallae 153, 157, 161, [205]
finitimorum 157, 175, 188
flaviclava 153, 157, 162, [222]
flavipes 153, 157, 160, [224, 227]
froggatti 157
fusciceps 157
galili 157
gambiensis 153, 157, 161, [213]
gestroi 157
gibbus 157, 180
gigas 157
gracilis 157
Grandiana 156
Grasseiana 156
guruti 155
harongae 224, 228
Heterandrium 158
heterandromorphum [152, 169]
hilla 214
hilli 156
hirtus 153, 157, 160, 164, [186]
Idarnes 156
imerinensis 194
Indothymus 155
infida 155, 188, 189
insignis 155
keralensis 157
kestraneura 153, 157, [162, 215]
Kradibia 156
larvalis 157
latrodicti 207
Leeweniella 158
liodontus 168, 170
Lipothymus 168
lomaensis 157, 183
longicornis 175, 188
longimucro 153, 157, 163, [201]
longipalpus 157
longiscapa 152, 157, 160, [164, 168]
longitarsus 157
malabarensis 157
masii 156
masoni 155
Micranisa 156
modesta 153, 157, 162, [218]
monilifera 155, 188
moniliformis 155
Monobaeus 224
montis 157, 180
naso 153, 157, 162, 220
nigrofasciata 214
nodularis 207
nota 157
notus 157
obscurus 194
Odontofroggattia 196
odorans 152, 157, 160, [163, 170]
orientalis (*Camarothorax*) 194
orientalis (*Ormyrus*) 228
Ormyrus 156, 223
ornatus 224, 228
Otitesella 156, 191
Paradecatoma 209
Parakoebelea 155, 156
Parasitodiplogaster 152- [154 (nematod)]

- parca* 153, 157, 159, 164, [176]
patellaris 157, 182
Pediobius 153
Pembertonia 156
Phagoblastus 152, 156, [169]
Philocaenus 169
Philotrypesis 156, 175
Philotrypomorpha 175
Physothorax 158
Platyscapa 156
plectroniae 215
Pleistodontes 156
prodigiosum 157
psenes 157
pteromaloides 155
punctiger 223, 228
punctum 153, 157, 162, [216]
quadriceps 155
quadrisetosa 157
raoi 157
reflexa 169
religiosae 155
remus 153, 157, 160, 164, [183]
reticulatus 156
Risbecoma 209
royi 157, 191
ruandensis 215
rubra 215
saptapurensis 155
sculptilis 224, 228
sebertianus 183
selenitica 175
serricornis 153, 157, 163, [196]
sessilis 153, 157, 162, 218
silvestrii 168, 169
similis 157
sjoestedti 183
socotrens 169
spinitarus 157
stabilis 155
stilifera 156, 188
stratheni 157
striatus 224, 228
stuckenbergi 151, 157, [160, 164, 165, 228]
subconicus 153, 157, 161, [228]
Syceurytoma 156, 208, [211]
Sycobia 156, 194
sycomori
(Eukoebelea) 157
sycomori (Sycophaga) 157
Sycophaga 156, 168
Sycophila 156, 205, 208, [211, 214]
Sycophilodes 156
Sycophilomorpha 156
sycophilon 152-154 [(nematod)]
Sycorycteridea 156, 179
Sycoryctes 155, 156, 179, [182]
Sycoscapter 156, 179, 180
Sycoscapteridea 156, 179, [188]
Sycotetra 156, 195
Systole 209, 211
temeraria 155
testacea 157
Tetramesa 209
Tetrastichus 153
Tineomyza 214
transiens 155
Tribaeus 224
triformis 168, 170
truncatus 183
tsamvi 153, 157, 161, 164, [191]
Walkerella 156
Wania 224
Waterstoniella 156
watshami 153, 157, 160, [224, 229]
Watshamiella 156, 186
westwoodi 157
xiphigaster 215

INDEX OF PLANT NAMES

- Acacia* 209
Adenosperma 155
avi-avi 183
baroni 169
benghalensis 155
burkei 149-229
callosa 157
capensis 154
carica 157
Conosycea 155
craterostoma 150
eriobotryoides 157, 175, [180, 183, 191]
Ficus 155, 157
exasperata 157
Galoglychia 157
Kalosyce 155
laterifolia 157, 180
leprieuri 169
Malvanthera 157
macrophylla 157
natalensis 150, 211, 213
nautarum 169
Neomorphe 157
nota 157
Oreosycea 155, 157
petersii 150, 169, 180, [183, 185, 193, 200, 213, 216, 221, 229]
racemosa 157
reflexa 169
religiosa 155, 189
Rhizocladus 155
Sinosycidium 155
soroceoides 180
Stilpnophyllum 155
stupenda 156, 188
Sycidium 157
Sycocarpus 157
Sycomor 157
sycomorus 157, 211, 213, [221]
thonningii 149, 150, 155- [157, 159]
Urostigma 155
variegata 157
vasta 169, 183
vogelii 152, 169, 175, 191

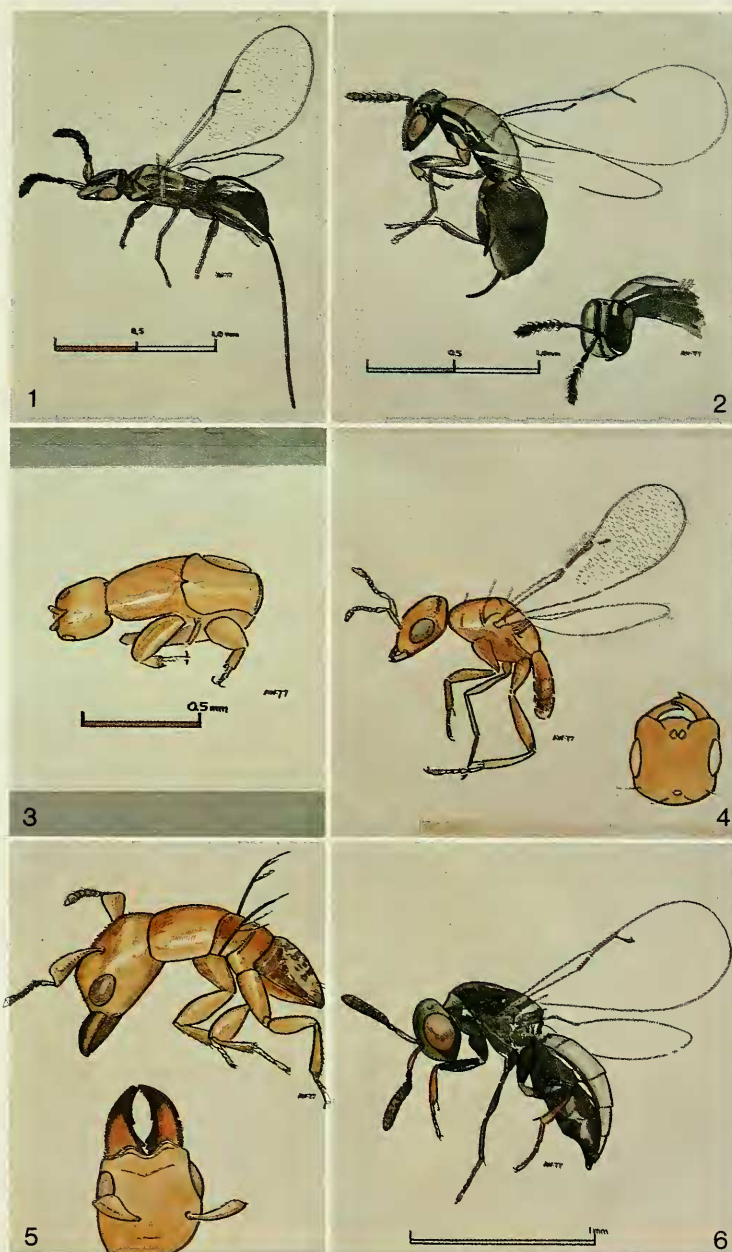


Fig. 1, *Elisabethiella stuckenbergi* (Grandi), female; 2, *Crossogaster odorans* Wiebes, spec. nov., female; 3, *Elisabethiella stuckenbergi* (Grandi), male; 4, *Crossogaster odorans* Wiebes, spec. nov., male; 5, *Otitessella tsamvi* Wiebes, spec. nov., male; 6, do., female.

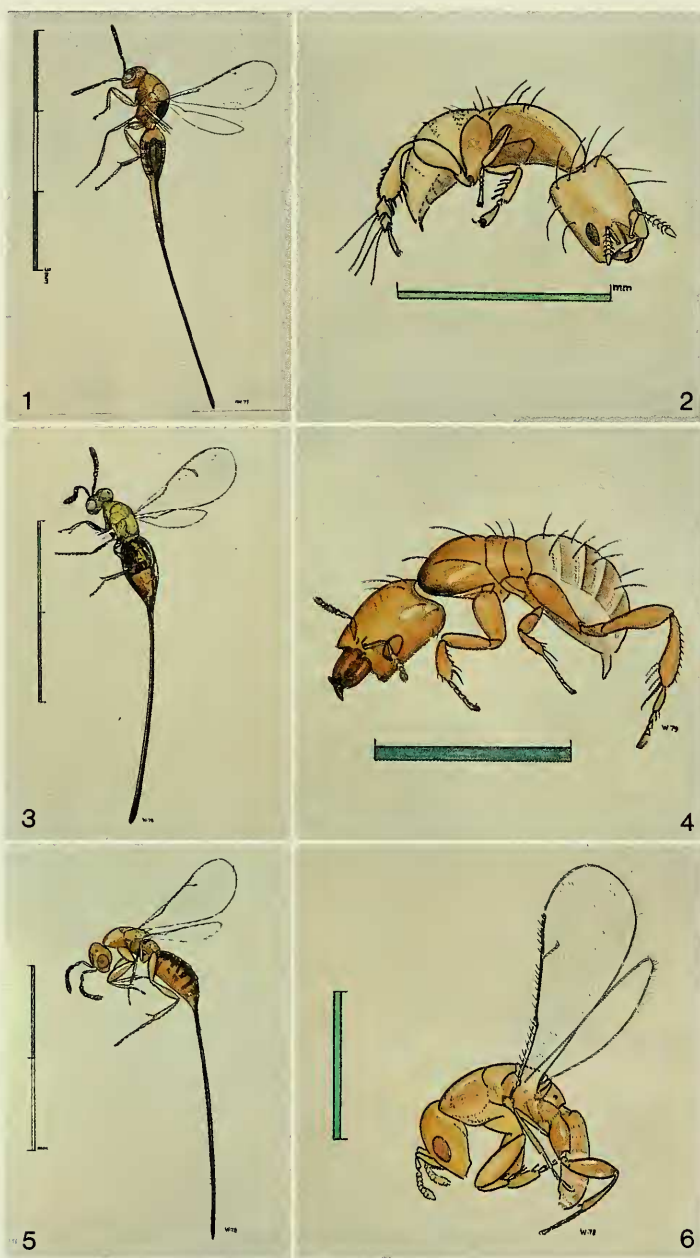


Fig. 1, *Philotrypesis parca* Wiebes, spec. nov.; 2, do., male; 3, *Sycosapter cornutus* Wiebes, spec. nov., female; 4, *Sycoryctes remus* Wiebes, spec. nov., male; 5, *Watshamiella alata* Wiebes, gen. et spec. nov., female; 6, do., male.

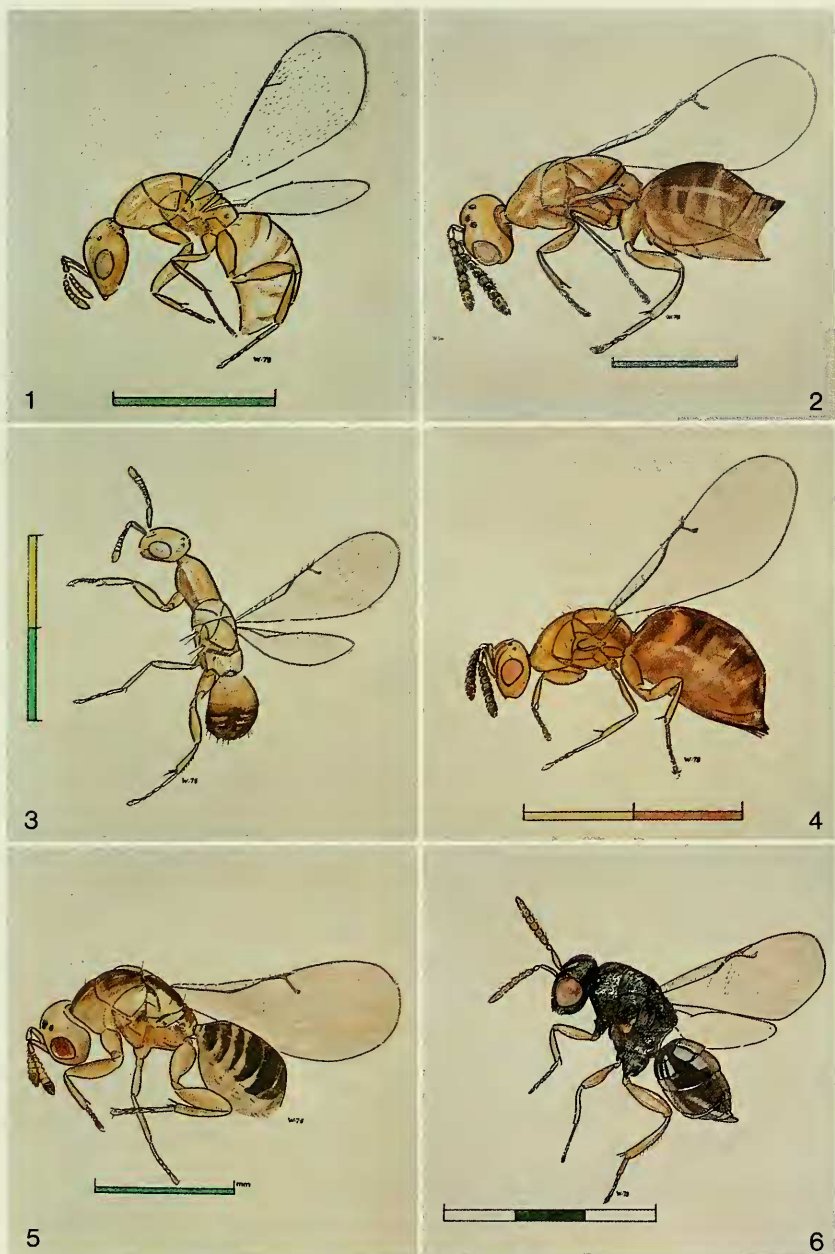


Fig. 1, *Philotrypesis parca* Wiebes, spec. nov., alate male; 2, *Sycotetra serricornis* Bouček, gen. et spec. nov., female; 3, *Camarothorax equicollis* Bouček, spec. nov., male; 4, *Camarothorax longimucro* Bouček, spec. nov., female; 5, *Camarothorax brevimucro* Bouček, spec. nov., male; 6, *Eurytoma ficusgallae* Bouček, spec. nov., female.

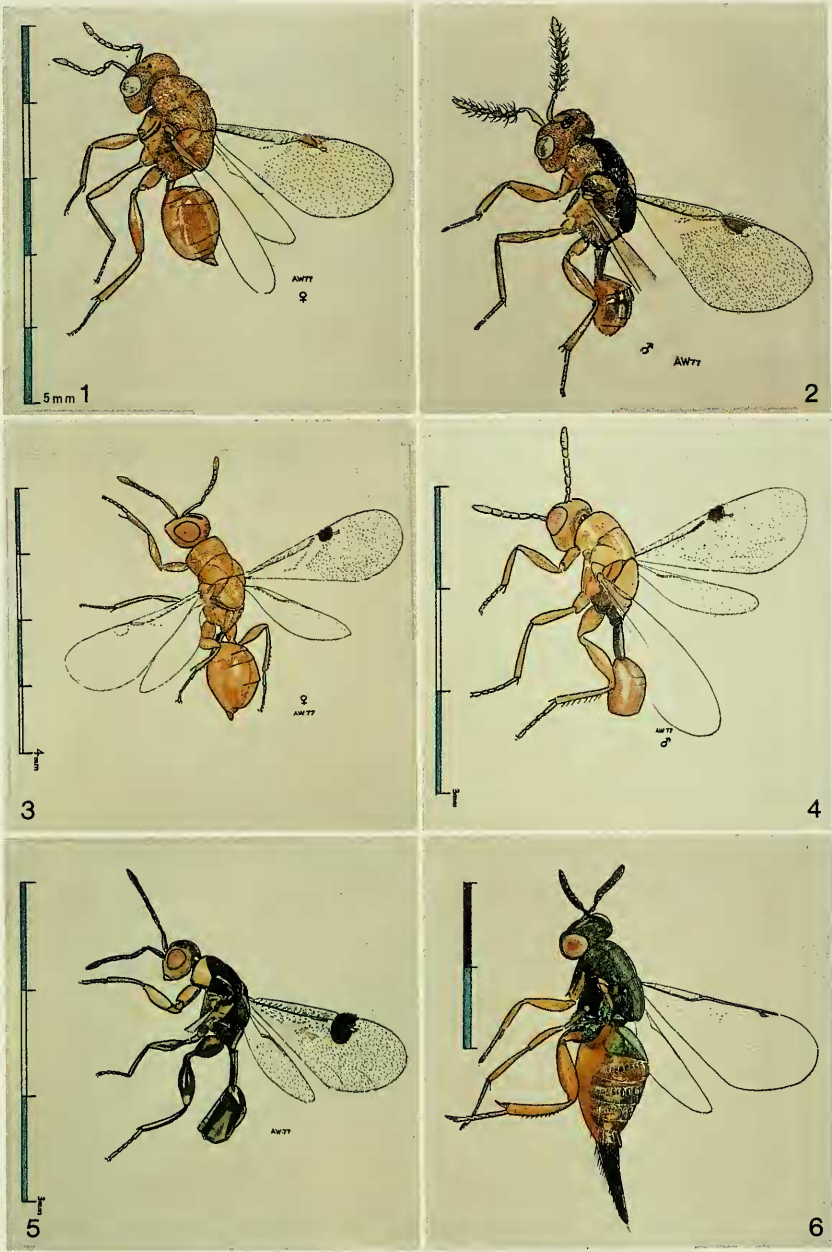


Fig. 1, *Syceurytoma ficus* Bouček, gen. et spec. nov., female; 2, do., male; 3, *Sycophila flaviclava* Bouček, spec. nov., female; 4, do., male; 5, *Sycophila kestraneura* (Masi), male; 6, *Ormyrus flavipes* Bouček, spec. nov., female.